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THE UNIVERSITY OF ALBERTA

THE IMPLICIT CONCEPT OF MEMORY

BY

YVONNE Y. W. KO

(C)

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

EDMONTON, ALBERTA

SPRING 1989

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Abstract

The prototypic structure of the memory concept was examined in the present research. Measures of internal structure included a free-listing task, readiness to use memory as a label for cognitive acts, and direct ratings of prototypicality (good or poor examples of memory). In addition, the memory concept of laypersons was compared to that of experts (researchers and practitioners working in the memory field). Finally, contextual influences on the perceptions of other people's memory performance was examined.

The results indicated that memory served as a high level superordinate label with strongly and weakly associated cognitive items. Laypersons rated task items such as short-term remembering, remembering time, remote events and names as strongly associated to memory. Items such as attention, anxiety about remembering, and achievement in remembering were weakly related. Such results indicated that certain items were more prototypic of the memory concept than others.

When the memory concept of laypersons was compared to those of researchers and practitioners, three memory dimensions were interpreted. The results indicated a process/content, a verbal/non-verbal, and a memory affect/non-affect dimension. Although comparable dimensions were interpreted in the three groups, it was evident that the researchers had better item clusters on the dimensions. The item clusters on the dimensions from laypersons and practitioners were more discrepant.

Finally, results indicated that contextual variables such as the disposition of the person and the situation surrounding an activity influenced

causal inferences about memory ability. Two types of causal information were presented to the participants, either the HHH (high consensus, high distinctiveness, and high consistency) or the LLH (low consensus, low distinctiveness, and high consistency) pattern. It was found that successful performance under the HHH pattern was attributed less situationally than failure performance whereas attributions of success performance under the LLH pattern was strongly dispositional. Finally, the results indicated that perceivers inferred more memory ability or disability in persons when dispositional attributions are made than when situational attributions are formed. In addition to task variables (e.g., short-term remembering tasks, tasks involving remote remembering), future research should be designed to account for contextual influences on the perceptions of memory ability.

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The Implicit Concept of Memory

Anecdotes about memory problems are reported in a wide variety of contexts. People often make comments such as "my memory is not as good as it used to be" or "I forget things now that I never did before". Such beliefs about one's memory problems may affect behavior in a number of ways. For example, some people may avoid reading novels because they believe they cannot retain a story-line. In addition, beliefs about memory ability may affect how people perform memory tasks. Some people may not use memory aids because they believe they have good memory abilities. Finally, self-reports about memory may be used by teachers to evaluate students' performance in a course, by physicians to determine whether treatment and diagnosis are needed, or by administrators to assess the appropriateness of admission to a nursing home. The study of how people perceive their own and others' memory therefore is important in the everyday world. Despite its practical significance, the study of laypersons' everyday perceptions and understanding of memory has been limited.

Rather than examining laypersons' memory concepts, most past and current research on memory have concentrated on the study of memory as systems or as containers of information. For example, Tulving (1984) classified three memory systems: procedural, semantic, and episodic memory. Others have defined memory as composed of associative, representative, and abstract types of memories (Oakley, 1981). Although researchers have operationalized the memory concept according to the above systems, it is unclear whether laypersons would have the same classifications

of memory.

The purpose of the present research was to examine the layperson's memory concept and to compare it with those of experts. If laypersons emphasized the remembering of past events as important to their concept of memory, then perhaps researchers should attend to this memory dimension. In the present series of studies, the laypersons' memory concept was examined for its prototypic structure. In addition, the memory classifications of laypersons were compared with those of memory experts. Finally, contextual influences on the evaluation of memory performance were investigated.

Traditional research on the memory of laypersons

Past research on the study of people's understanding of memory has focused on metamemory, defined by Flavell (1971) as the individual's knowledge, and awareness of memory. Metamemory is operationalized as an individual's awareness that some things are easier for him/her to remember than others, that it is possible to recall an item whereas another item's recall is beyond present capability, and of the process required for storage of information (Flavell & Wellman, 1977).

In metamemory research, the study of laypersons' memory has relied on questionnaires. Although the investigation of ecologically valid phenomena is important, such phenomena are often difficult to operationalize in a laboratory setting. For example, if people are examined for their ability to remember names, the participants must be observed over the various occasions where such events may occur. Herrmann (1982)

proposed that questionnaires present a more efficient method of studying memory abilities in people.

In metamemory questionnaires, people are asked how they would perform on certain memory tasks and in certain situations. The underlying assumption is that responses to such questionnaires reflect people's actual memory performance. However, when the correspondence between the questionnaire responses and actual memory performance was examined in a number of studies (Herrmann, 1982; 1984), little relationship was found between people's reported memory abilities and their actual abilities. There are several possible reasons for such unimpressive findings (Morris, 1984). First, the questionnaires would have to be applicable to a large population in addition to being specific enough for participants to answer. For example, asking participants if they remember the correct area codes on long-distance phone numbers (Herrmann & Neisser, 1978) may be appropriate for those who make such calls but inappropriate for people who engage in this activity infrequently.

Second, although people may have memory failures, the possibility exists that the failures are not remembered and therefore not reported. During the span of the day, we probably experience many instances of memory failures. For example, we often cannot think of the proper words to use when writing, or we forget to perform errands. However, we have adapted quite well to lapses in memory. When our memory is assessed, we simply remember to report the rare memory failures such as forgetting an important meeting and tend not to remember to report common everyday

nondisruptive memory failures (Morris, 1984).

Finally, many metamemory questions (e.g., West, Boatwright, & Schleser, 1984) are unrelated to the task performed. For example, participants may be asked to rate their memory for phone numbers and names and these subjective ratings are correlated with performance on a paired associate learning task. Therefore, it is not surprising when low correlations are found between subjective reports and objective performance.

The prototypic structure of concepts

Given people's difficulty with subjective memory reports, perhaps it would be appropriate to closely examine the implicit memory concept of laypersons. Implicit concepts have been defined as constructions that reside in the minds of individuals (Sternberg, Conway, Ketron, & Bernstein, 1981). The goal in the study of implicit theories is for researchers to reconstruct such existing theories from people rather than construct new ones. In contrast to implicit theories are explicit ones, which are constructions of researchers based on tasks presumed to measure the concept of interest. Although Sternberg et al. were interested in the concept of intelligence, their arguments for the study of implicit theories apply to the study of memory. Studies on the implicit concept of memory may lead to the discovery of important memory dimensions for laypersons that memory experts have ignored in their research.

Sternberg et al. (1981) studied the implicit concepts of intelligence from experts and laypersons. In the first experiment, they asked persons studying in a library, entering a supermarket, and waiting for trains at a

railway station to list behaviors characteristic of either intelligence, academic intelligence, everyday intelligence or unintelligence. Each person also rated him or herself on each of the four types of intelligence. The basic assumption was that persons with different orientations in their life have different concepts of intelligence. They found that people have organized conceptions of intelligent behavior and different populations appear to have a concept specific to that group. For example, participants who were students studying in a library perceived intelligence as being academically related but unrelated to everyday behaviors. Participants who were people shopping in supermarkets and people waiting for trains perceived intelligence as being related to everyday intelligence but not to academically related behaviors.

In an attempt to disentangle the different types of concepts, Sternberg et al. (1981) compared the experts' (researchers and theorists studying intelligence) and laypersons' characterizations of the four types of intelligence. They found that experts and laypersons had different views of the intelligence concept. Although people had prototypes for an ideally intelligent person, the prototypes were not identical for experts and laypersons.

Finally, Sternberg et al. (1981) were interested in knowing whether people used the prototypes in everyday evaluations of the intelligence of others. They provided individuals with written, behavioral descriptions of other people and found that the evaluations were based on people's implicit theories. Linear modeling of the data showed that practical problem solving ability, verbal ability, and social competence were the best predictors of

intelligence. These predictors were those found in people's implicit theories of intelligence. Sternberg et al. concluded that the knowledge of a person's implicit theory could be used to predict that person's evaluation of others and of himself or herself.

Although Sternberg et al. (1981) did not examine explicitly the structure of the intelligence concept, the nature of the categorization process is important in the study of concepts. Traditionally, the classical view holds that all the members of a concept share properties that are necessary and sufficient conditions for its definition (Medin & Smith, 1984) and concepts are perceived as having clear and precise boundaries. However, the classical view has been criticized on numerous grounds. For example, researchers have not been able to define clearly the properties of most object concepts, and some members of the category are more typical of the concept than others (see Medin & Smith, 1984 for a review).

Rosch (1975) proposed a different approach to the study of concepts to replace the classical view. Rosch argued that many everyday concepts such as fruit and vehicle are organized around the ideal examples, known as prototypes. More prototypical members have more attributes in common whereas less prototypical members share fewer common attributes and have more attributes in common with adjacent concepts. For example, the concept of fruit may be graded from the most prototypic examples such as apples and oranges to mediocre examples such as coconuts to poor examples such as olives, which may have more attributes in common with vegetables than with fruits.

The prototypic structure was initially used to study more concrete concepts such as fruits and furniture. However, Hampton (1981) has examined the prototypic structures of abstract concepts (e.g., a work of art, a belief, a crime, a just decision, an instinct, a rule, a science, and a kind of work). He asked participants to list features that are of importance in determining whether something was correctly described by each abstract concept. He found that participants were able to list attributes for each of the concepts of interest. For example, features associated with a belief included: it is something human, it is something held to be true, and it is personal. Then he asked participants to list typical, atypical, related non-members and unrelated non-members examples for each concept. Again, he found that participants were able to give examples under each of the categories. For example, participants listed Buddhism as typical, Evolution as atypical, Atheism as a related non-member, and the alphabet as an unrelated non-member example of a belief concept.

Hampton (1981) found that abstract concepts such as a science, a work of art, and a crime have specific features related to each. However, concepts such as a belief, a rule, and an instinct yielded unclear definitions where there were overlapping features between concepts. Hampton suggested that abstract concepts, unlike concrete concepts, have an almost unlimited range of possible attributes. The result is that total agreement of listing defining features between people is unlikely. Furthermore, the types of information used in defining abstract concepts are different from those in defining concrete ones. Hampton suggested that people use sources such as

behaviors, motives, and social meaning to generate attributes of the concepts. Therefore, the relationship between the features may result in more complex conceptual structures.

Despite the problem of overlapping features in abstract concepts, there was success in studying the prototypic structure of the concept of emotion (Fehr & Russell, 1984). In the first experiment, participants were asked to list freely the kinds of things associated with the category emotion. Fehr and Russell assumed that the listing would provide the items associated to an emotion category. They found that some subcategories of emotions came more readily to mind (i.e., happiness, anger, sadness, and love).

Fehr and Russell (1984) also examined how likely it was for the listed subcategories to be subsumed under the super-ordinate label of emotion. They found that participants were able to label correctly the examples provided and also to readily substitute the examples for the word emotion in sentences. Therefore Fehr and Russell concluded that the more prototypic members would elicit the super-ordinate label of emotion.

They also examined the degree to which each example resembled other emotions. Participants were asked to rate the extent each of the target emotions are good or bad examples of the concept. High test-retest reliability of the ratings across participants was found. This indicated that people are quite consistent in their ratings over time. However, the mean correlations between any two raters were low indicating variability of ratings across people. Fehr and Russell concluded that participants are capable of forming meaningful ratings of good or poor examples of emotion.

In another experiment, Fehr and Russell examined the possibility that prototypical emotions serve better than nonprototypic ones as substitutes for the word emotion in sentences. Participants were asked to rate how natural sentences were. The sentences had target emotional terms substituted for the word emotion. They found that substitution of more prototypic examples produced more natural sounding sentences. However, they also found that some sentences derived from introductory psychology textbooks sounded peculiar even when the most prototypic examples were substituted for the word emotion (e.g., "Sadness accompanies motivated behavior; the effect can be facilitating or interfering." p. 474).

Sehulster (1981) studied a self-theory of memory and focused his research on people's beliefs about their memory, their trust in their memory, and in how memory may influence people's behaviors. Sehulster claimed that people's beliefs about their memory ability are a subset of people's self-theory. He also claimed that the amount of risk people take in performing a memory task may be a more sensitive measure of people's memory beliefs than are self-reported measures. Finally, people's trust in their own memory abilities may reflect how eagerly they engage in memory-related behaviors (e.g., performing memory tasks without mnemonic aids if they believe they have high memory ability). Although Sehulster did not examine the prototypic structure of memory, his studies did provide an indication of the different components involved in the laypersons' memory concept.

Sehulster (1981) asked participants to complete a memory scale

composed of 60 items ranging from memory for songs and jokes to memory for news events and dreams. The items were constructed in an attempt to cover areas of memory use in daily life. Participants were asked to rate their memory abilities on these tasks. A factor analysis yielded three clusters of memory beliefs, a verbal dimension (e.g., memory for the spoken word, names, trivia), a memory of the past dimension (e.g., childhood events, painful experiences, smells), and an appointments dimension (e.g., memory for appointments, personal articles, anniversaries). These three dimensions presumably represented the structure of a self-theory of memory.

In the next experiment, Sehulster (1981) asked participants to complete trivia questions based on television shows and movies. He correlated these answers with the three factors found in the first experiment and results indicated only the verbal factor to be moderately related ($r < .40$) to the trivia quiz. Such results suggested domain specificity (Ko, Rule, & Dobbs, 1988) between subjective reports and objective tasks. That is, because the trivia quiz is highly related to a memory for names component (e.g., name the actors in a particular television show), it was not surprising that such answers are related to the verbal dimension of memory. The memory for the past dimension (Factor 2) was uncorrelated with the trivia questions and the appointments dimension (Factor 3) was only correlated with the incorrectly answered questions to the trivia quiz.

In a final assessment of people's memory beliefs, Sehulster (1981) examined risk taking behaviors. His view was that people's memory beliefs may be reflected in the amount of risk taken in a task that involves memory.

For example, people who believe they have good memory ability for remembering appointments may not write down the time in an appointment book.' To assess this question, Sehulster asked participants to answer a trivia quiz about television shows and movies and asked participants to wager an amount for each question. The results showed that people who rated themselves high on verbal ability waged more money on the trivia quiz. Such results suggest a need to examine domain specific relations.

Goals of the research and overview

Given that at least some abstract concepts have a prototypic structure (Fehr & Russell, 1984; Sternberg et al., 1981), the concept of memory was examined for its prototypic structure in the present research. In addition, there is strong indication from Sternberg et al. and at least weak support from Fehr and Russell that the structure of concepts may not be shared among different groups of people. In particular, the concept of laypersons may be different from those of experts (e.g., psychologists, researchers, and practitioners working in the area of interest).

The primary goal of the present research was to examine laypersons' concept of memory. Data were collected to examine people's internal structure of the concept. Measures of internal structure included frequency of a free-listing task, readiness to use memory as a label for cognitive behaviors, and direct ratings of prototypicality (i.e., good or poor example of memory).

A secondary goal was to compare the memory structures of laypersons and experts. The memory concept of experts may be different from that of

the laypersons. For example, the experts may categorize memory as systems whereas such a classification may not be significant for laypersons who are more concerned about their everyday memory experiences.

A third and final goal of the present research was to investigate the contextual influences on the perceptions of other people's memory performance by laypersons. Participants were asked to provide causal explanations for other people's cognitive behaviors when information relevant to performance was provided.

In the present research, the implicit concept of memory was explored through a series of five studies. Study 1 asked participants to freely list exemplars of the memory concept. Study 2 provided participants with descriptions of tasks and measured the extent to which participants used memory as a category label for the tasks. Study 3 asked participants to make ratings of the prototypicality of exemplars of memory (e.g., rate whether exemplars were good or poor examples of memory). These first three studies provided the most direct measure of an internal memory structure. In these experiments, the utility of Rosch's (1975) prototypicality analysis toward the study of memory was assessed. The question, "Do people's concept of memory follow a prototypic definition, and if so, what is the implicit structure?" was examined.

The first three studies attempted to show the laypersons' structure of the memory concept. In Study 4 the similarities or differences in the memory concepts of laypersons, experts, and practitioners were examined. Due to the differences in the memory knowledge base among the three groups, the

groups were expected to possess variant concepts with some overlap. For example, perhaps most of the people treated by the practitioners have long-term memory deficits. Subsequently, practitioners might consider the long-term memory dimension as the most relevant. For laypersons, it may be that remembering to do something in the future (e.g., to keep an appointment) has the most relevance in everyday remembering and this may result in a strong weighting of this dimension. It also was assumed that the structure of the memory concept is organized and the organization may be studied through a multi-dimensional scaling (MDS) method. This technique permits examination of the degree of similarity between exemplars of memory. The assumption is that items that closely resemble the memory concept will be discernable from unrelated items.

In the fifth study, the extent to which people make judgments about the memory successes or failures of other people was examined. In all of the present studies, the concept of memory was investigated as primarily composed of different task and performance variables. For example, in Study 3 people were presented with instances of cognitive tasks and were asked to rate the tasks as good or poor examples of memory. In this way, the internal structure of memory was defined solely in terms of various cognitive tasks. In addition to task variables, however, contextual variables could affect situational and dispositional causal inferences. And such causal inferences may in turn affect people's evaluations of whether certain events belong in their memory concept.

Contextual variables included information about the situation

surrounding the activity and information about the disposition of the person. Such information permitted people to form different attributions with regard to the memory ability of the person. One must decide whether another person's ability to remember was due to some internal attribute of the person (dispositional) or due to the particular circumstance in which the activity occurs (situational). For example, if it were observed that situational events inhibited a person from remembering, then the person may not be blamed for the memory failure. Conversely, if situational events were conducive to remembering and the person failed, the likely attribution may be dispositional (e.g., the person does not have a good memory). Therefore, this final study examined the influence of both task and contextual variables on people's perceptions of memory ability.

Study 1

Using Rosch's (1975) prototypic categorization approach, participants were asked to list exemplars based on their concept of memory. Although distinctive responses were expected because every person has personal examples of memory related experiences, it was expected that shared exemplars of the concept existed among people. The shared attributes of the memory concept would be examples most frequently listed by a large number of participants. These commonly listed items may be considered as subcategories of the overall memory concept.

Method

Subjects

One hundred and fifty students participated in the study as an option for partial fulfillment of their introductory psychology course requirements and were tested in groups of 10.

Procedure

After arrival in the laboratory, participants were asked to list instances (examples) of MEMORY and were told that the instances listed should be indicative of what memory means to them. Participants were asked to refrain from using word associations to derive their memory examples. They were given one minute to list the instances or to stop after listing 20.

Results and Discussion

A total of 128 different instances were listed by the participants. The number of listed responses ranged from 1 to 13 instances with an average of 5.9 instances generated by each participant. Of the 128 instances, 35 were

idiosyncratic, resulting in 93 items listed by two or more people. The most frequently listed exemplar of memory was to "remember". A closer examination revealed that some of the listed instances were for broad events (e.g., recollect, emotion) whereas other instances were at a very specific level (e.g., remember dates, names). The 128 responses are listed in Table 1.

The most frequently listed instances indicated examples of memory processing. For example, remember, recollect, study, memory of past, short-term memory, and long-term memory all indicated some variety of memory processing. These instances are in contrast to exemplars such as experience, names, and faces that indicated accessing memory content. It should be noted that the majority of the most frequently listed instances may be classified as memory processing versus the more idiosyncratic memory content responses. In the present study, laypersons indicated that the processing of information may be more important than the retrieval of content to their memory concept.

In addition, this first study indicated that people can provide the relevant examples associated with their concept of memory. Corresponding to Fehr and Russell's (1984) research, where emotion was the superordinate label, MEMORY served as the high level superordinate label in the present study. Lower level subcategories of MEMORY were provided in people's free-listing of exemplars. From a prototypic view, the more commonly listed memory processing exemplars (e.g., remember, recollect, study) were mid-level subcategories and represented the most closely connected members of the memory concept.

In addition to mid-level subcategories, people provided listings of the lower levels of the memory concept. These low-level subcategories were the memory content relevant items such as phone numbers and vocabulary that may be specific to each individual's concept of memory. From the results, it was interpreted that people treated memory as a superordinate category with mid-level subcategories representing memory processing and low-level subcategories indicating memory content.

Table 1

Free listing of exemplars of memory

Remember (51)
Recollect (37)
Study (36)
Memory of past (34)
Short-term memory (34)
Long-term memory (32)
Thought (30)
Memory for events (30)
Childhood experiences (29)
Emotion (25)
Brain related (23)
Forgetting (22)
Sensory (18)
Test (18)
Experience (17)
Names (13)
Do calculation (13)
Remember dates (12)
Faces (12)
Associate (11)
School (11)
Good/bad memory (10)
Mind (10)
Learning (10)
Dreams (9)
Places (9)
Mnemonics (9)
Vocabulary (9)
Phone numbers (8)
Trips (8)
Pictures/figures (8)
Loss of memory (7)
Intelligence (7)
People (7)
Repetitive learning (7)
Retention (6)
Deja vu (6)
Memorization (6)
Photographic memory (6)
Retrieval (6)
Music (6)
Storage (5)
Routine (5)
Recall events (5)
Learned skills (5)
Recognition (5)
Importance (4)
Remember formula (4)
Flashback (4)
Numbers (4)
Remember actions (4)
Search memory (4)
Relate story (4)
Practice (4)
Memory games (4)
Lists (4)
Play/poem (4)
Books (3)
Mental process (3)
Knowledge (3)
Remember to do things (3)
Schema (3)
Address (3)
Learn languages (3)
Time (3)
Computer memory (3)
Concentration (3)
Reading (3)
Helpful (3)
Reminisce (3)
Direction (3)
Age (2)
Capacity (2)
Appointment (2)
Something kept (2)
Sequence (2)
Cognitive (2)
Speed/accuracy (2)
Recite (2)
Necessary (2)
Subconscious (2)
Semantic (2)
Encode (2)
Comprehension (2)
Amnesia (2)
Assimilate (2)
Imagery (2)
Useful (2)

Table 1 (continued)

Free listing of exemplars of memory

Senile (2)
Classification (2)
Dancing (2)
Psychology (2)
Jokes (2)
Concept (1)
Library (1)
Vivid (1)
Feedback (1)
Meaningful (1)
Identify (1)
Strain on memory (1)
Explanation (1)
Remember prices (1)
Driving (1)
Tip of tongue (1)
Logic (1)
Ability (1)
Terms (1)
Souvenirs (1)
Ideas (1)
Motivation (1)
Conscious thought (1)
Reoccurring (1)
Writing (1)
Lose things (1)
Research (1)
Assignments (1)
Report cards (1)
Simple/complex (1)
Told someone something (1)
Loci memory (1)
Personality (1)
Fading (1)
Memory rules (1)
Trauma (1)
Review (1)
Takes time (1)
Note (1)
Abstract (1)

Note. The number in parentheses is the number of participants out of 150, who listed each item or some variant of it.

Study 2

Participants were asked to provide a general category label for a list of items that are commonly identified as cognitively related (e.g., short-term memory, retrospective memory, etc.). The assumption was that the activities closest to the people's memory concept would be subsumed under a memory label. The more prototypic members would elicit the superordinate category label (MEMORY) whereas the activities that were not prototypically related to memory would be subsumed under other labels to which the activities were more closely associated. This study was designed to assess the different subcategories that define a memory concept.

In Study 1, the generated items provided exemplars corresponding to existing memory and metamemory questionnaire items. For example, the item "able to remember events from childhood" used in the present study was listed as "childhood experiences" in Study 1. The stimuli in the present study, composed of items used in memory and metamemory research, consequently are similar to exemplars listed by laypersons.

Method

Subjects

Fifty introductory psychology students participated as an option for part of their course requirements and were tested in groups of 10.

Materials

Eighty-three items were composed from an assortment of memory and metamemory questionnaires. The items were derived from the Cognitive Failures Questionnaire (Broadbent et al., 1982), Metamemory in Adulthood

questionnaire (Dixon and Hultsch, 1983), Memory Functioning Questionnaire (Gilewski, Zelinski, Schaie, & Thompson, 1983), Short Inventory of Memory Experiences (Herrmann, 1979), and the Memory Questionnaire (Sunderland et al., 1984). The 83 items were not intended to be exhaustive in the representation of memory domains. Rather, items were selected to encompass the areas in which people use memory and the relevant memory domains as indicated by participants in Study 1. Furthermore, as a method of data reduction, two independent judges grouped the 83 items resulting in 26 subcategories with a minimum of 3 items under each. These 26 subcategories were labelled with names representing common topics and research areas in cognitive psychology (e.g., short-term memory, remote memory, comprehension). Furthermore, two forms of the items, either a success or a failure performance, were presented. For example, "able to remember details of what happened a day or two ago" in the success condition was presented as "unable to remember details of what happened a day or two ago" in the failure condition. (The stimulus items are presented in Appendix A.1).

Procedure

Participants were randomly assigned to the success or failure performance condition. They were asked to provide a category label for each of the 83 items. The participants were told they could repeat a label as often as they wished, that there were no correct or incorrect answers, and that researchers were interested only in their opinions. They were not provided with a choice of labels and were required to generate the labels that they

thought appropriately described the item.

Results and Discussion

When the variety of labels from the participants were tabulated, only 14 out of 83 items in the success condition had been given no label of "MEMORY" at all. Of these 14 items, three were concerned with activities (e.g., participants generally labelled these under an "Interest" category), three with attention (e.g., generally labelled as "Concentration"), two with expressive language (e.g., commonly labelled as "Creative"), two with anxiety about memory (e.g., more commonly labelled as "Emotion"), and one each for achievement, comprehension, ongoing activities, and short-term memory. In the failure condition, 12 out of 83 items were not given a label of "Memory" from any of the participants. Of these, three items were concerned with activities, three with attention, two with expressive language, and one each for remembering time, word finding, ongoing activities, and short-term memory.

In a further tabulation, the 83 items were summed into their respective subcategories. The percentage of participants providing "Memory" as the superordinate category label for each of the 26 subcategories is presented in Table 2. For example, a total of 50.7% of the participants in the success condition provided "Memory" as the superordinate label for the remembering names items with the remaining participants providing a variety of other labels. However, a few of the subcategories had major differences in the percentage of participants providing the "Memory" label. For example, 21.3% of the participants in the success condition provided the "Memory"

Table 2

Percentage of participants providing "MEMORY" as the Superordinate category label for the 26 subcategories

Performance		
Success	Failure	Subcategory
50.7	48.0	Names
45.3	45.3	Source
44.0	45.3	Remote
44.0	45.3	Updating information
43.0	42.0	Prospective
40.0	49.3	Change
40.0	36.0	Facial
37.3	41.3	Prospective content
37.3	38.7	Direction following
37.1	41.1	Retrospective
36.0	33.3	Task
32.0	33.3	Time
32.0	30.7	Visuo-spatial
29.3	34.7	Capacity
28.0	38.7	Intent
21.3	13.3	Ongoing
21.3	37.3	Stress
13.3	12.0	Short-term memory
9.3	22.7	Word finding
8.0	12.0	Achievement
8.0	16.0	Locus of control
6.7	4.0	Comprehension
1.3	9.3	Anxiety
1.3	2.7	Expressive language
0.0	0.0	Attention
0.0	0.0	Activities

Note. The above percentages are summed over the items comprising the subcategories.

label for the ongoing activities subcategory whereas only 13.3% did in the failure condition. In contrast, 9.3% of the participants provided the "Memory" label for the word finding subcategory in the success condition whereas 22.7% provided a memory label in the failure condition. These discrepancies indicated that memory concepts may be affected by the direction of the items' valence. Finally, there were a few subcategories in which the "Memory" label was not used at all. For example, items such as activities and attention were not perceived as memory related subcategories. Examples of labels provided by participants for each subcategory are presented in Appendix A.2.

It is important to note that the 83 stimulus items were derived from existing memory and metamemory questionnaires. Most of the items were identified as memory relevant by at least some of the participants. However, certain items used presently in memory questionnaires are not considered as components or associates of MEMORY by laypersons (e.g., attention, activities, expressive language, comprehension, anxiety about memory). This may be an indication that laypersons and memory experts have slightly different memory concepts.

Finally, although people readily derived the general MEMORY category label for a majority of the items, it was unclear whether people regard these items as good examples of memory. The next study investigated this issue.

Study 3

The third study of the series provided a direct measure of the

prototypicality of exemplars of memory. Participants rated the extent to which cognitive activities were good or poor examples of memory. Once again, the assumption was that activities more closely related to a memory concept would be rated as better examples of memory than less related ones.

Method

Subjects

Fifty participants from introductory psychology courses were recruited for this study. They participated as an option for course requirements and were tested in groups of 10.

Materials

The same 83 items from Study 2 were used. Again, two formats, involving success and failure performance were used.

Procedure

Participants were randomly assigned to one of the two conditions. They were asked to rate each of the items on a 7-point scale from a poor example of memory (1) to a good example of memory (7). Participants were also provided with the choice of rating the item as not an example of memory at all. In past research (e.g., Fehr & Russell, 1984), participants were forced to rate items on a continuous scale with the assumption from researchers that all items were in some way relevant to the concept in question. The present study was unique in that participants were allowed to rate items as not examples of the concept at all.

Results and Discussion

Mean ratings were tabulated for each of the 83 stimulus items. For

the success performance items, 17 of the items were rated as not being a memory example at all by 50% or more of the participants. Of these 17 items, two were concerned with attention, three with anxiety about memory, three with activities, two with locus of control, two with achievement, and one item each for short-term memory, ongoing activities, comprehension, expressive language, and time. In the failure condition, the results showed that 13 of the initial 83 items were given a rating of a "not a memory example at all" from 50% or more of the participants. Of these 13 items, three were concerned with activities, three with anxiety about memory, three with achievement, two with locus of control, and one each for ongoing activities and expressive language. These results corresponded to those found in Study 2. For example, items concerned with memory anxiety and attention were not subsumed under a "Memory" label.

For the purpose of further data analysis and also correspondence with past analytic procedures (e.g., Fehr & Russell, 1984), participants' ratings of items that were not examples of memory at all were recoded as a rating of 1 to indicate poor examples of memory. In addition, the 83 items were grouped into the 26 respective subcategories by two independent judges. The mean ratings of each subcategory are presented in Table 3. There was a gradation from good to poor memory examples. The area rated as the best representative of memory under the success condition is short-term memory (e.g., have no difficulty remembering a phone number even if interrupted before dialing). The area least representative of memory are those involving activities (e.g., spends a lot of time reading books). It should be noted that

the lowest ranked items were those rated as not memory examples at all by a majority of the participants. Perhaps in future memory assessment questionnaires, it should be asked what is, and what is not relevant to people's memory concept.

In the failure condition, participants' ratings of not memory examples at all also were recoded to reflect poor memory examples. Again, the 83 items were grouped into the 26 subcategories. The mean ratings and ranks are presented in Table 3. The subcategory rated as the best example of memory in the failure condition was visuo-spatial (e.g., unable to recognize places told to have visited before) and the lowest rated subcategory was activities. Overall, the areas rated to be least associated with memory involved activities, anxiety, achievement, and attention in both conditions. Such results are consistent with those found in Study 2.

Although the ranks of the subcategories changed across the success and failure performance conditions, there were parallel ranks. The rank order correlation between success and failure performance conditions was $r = .87, p < .01$. An examination of the last six subcategories indicated they were ranked similarly across the two conditions. Removal of these last six categories from the analysis resulted in non-significant rank order correlation. This indicated that there were differences in the way people rated the items under the two conditions.

The most interesting results were the differential mean ratings and ranks in the two conditions. Although short-term memory was the top ranked subcategory in the success condition, it was only ranked 15th in the failure

Table 3

Participants' prototypicality ratings for the cognitively positive and negative conditions (Subcategorized)

	Performance				
	Positive		Negative		
Subcategory:	Mean	Rank	Mean	Rank	Subcategory:
Short-term	6.35	1	6.04	1	Visuo-spatial
Time	5.84	2	5.77	2	Prospective content
Remote	5.75	3	5.63	3	Prospective
Name	5.64	4	5.50	4	Retrospective
Intent	5.59	5	5.45	5	Intent
Visuo-spatial	5.52	6	5.41	6	Ongoing
Comprehension	5.49	7	5.23	7	Name
Source	5.48	8	5.21	8	Direction following
Capacity	5.33	9	5.11	9	Source
Prospective	5.31	10	5.05	10	Time
Change	5.11	11	4.85	11	Remote
Stress	5.04	12	4.77	12	Updating
Updating	5.03	13	4.76	13	Change
Facial	4.93	14	4.69	14	Facial
Retrospective	4.91	15	4.64	15	Short-term
Prospective content	4.91	16	4.63	16	Word Finding
Direction following	4.89	17	4.50	17	Expressive language
Task	4.61	18	4.52	18	Capacity
Ongoing	4.57	19	4.20	19	Comprehension
Expressive language	4.52	20	4.15	20	Locus of control
Word finding	4.40	21	4.07	21	Stress
Locus of control	4.31	22	3.98	22	Task
Achievement	3.55	23	3.41	23	Anxiety
Attention	3.32	24	3.35	24	Attention
Anxiety	3.11	25	2.51	25	Achievement
Activities	2.80	26	1.83	26	Activities

Note. Ratings were made on a scale from extremely poor example (1) to extremely good example (7). Ratings of not an example of memory at all were recoded as (1).

condition. There were also major discrepancies in the ratings for the memory involving time, remote events, prospective and retrospective remembering, comprehension, capacity, stress, and ongoing activities in the success condition with those in the failure condition. This indicated that people's memory concept is affected by items indicating success or failure in performance.

The results indicated that rating of an item as memory relevant depends on whether performance reflects success or failure. Pershaps the ability to remember something (successful performance) is nothing special but to forget something (failure performance) is unusual. Failure situations may be regarded as distinctive and corresponding ratings reflect the items important to defining people's memory abilities. For example, unable to find the door used to enter a shopping mall (visuo-spatial remembering), not remember what to buy at the store once you get there (prospective content), and unable to remember irregular appointments (prospective remembering) are the failures that help define memory for laypersons.

This study indicated that there are overlapping as well as unique features in people's concept of memory. People commonly identified certain cognitive items as memory relevant, pointing to the presence of organized internal structures for the memory concept.

Study 4

The previous three studies attempted to identify the prototypic structure of the layperson's memory concept. The purpose of Study 4 was to assess the memory concepts of laypersons and experts and to compare them

with one another. The memory concept was operationally defined as the number and the type of memory dimensions interpreted by the participants. Laypersons and experts were presented with a variety of cognitively relevant items. These were based on the items presented in Studies 2 and 3. The items were presented in pairs and the participants' task was to rate the degree of similarity between the items. A multidimensional scaling analytic technique (MDS) was used to determine the underlying organized and relevant structures for both laypersons and experts. The responses of two expert groups, memory researchers and practitioners treating patients with memory problems, were examined.

Method

Subjects

There were three groups of participants. The first group was comprised of laypersons and consisted of 48 students enrolled in introductory psychology courses. They participated in the study as an option in partial fulfillment for course requirements. Participants were randomly assigned to a form of either of two sets of stimulus items. Attempts were made to recruit mature students in the present study to decrease the age differences between laypersons and experts. The lower age limit was set at 30 and the average age of the layperson participant was 33.4 years.

Ninety-seven people, identified as memory researchers, were sent questionnaires through the mail. All of them were psychologists actively conducting research in the field of memory and/or metamemory in Canada and in the United States. They were selected if they had published memory

research in scholarly journals in the past two years. They were randomly assigned to a form of either of two sets of stimulus items. Of the questionnaires mailed, 53 were returned. However, in 13 cases, the questionnaire was not completed by the respondent. Reasons for refusal ranged from not being able to spare the time to complete the questionnaire to not considering themselves as memory researchers.

The final group of 37 people, identified as practitioners (psychologists, psychiatrists, neurologists) working with memory problem or memory impaired people in Edmonton and surrounding areas, were sent questionnaires in the mail. Only 9 of the 37 completed and returned their questionnaires. Although this was not a high return rate it did provide some basis for comparison with the other two groups.

Materials

Two sets of stimulus items were constructed based on the 83 items used in the previous two studies. Two items from each of the 26 subcategories were chosen and were assigned to one of the two stimulus sets. The memory change subcategory was deleted from the stimulus sets because the items encompassed a time element that was indistinguishable from the time subcategory. As a result, each stimulus set was composed of 25 items. Furthermore, because of the limited number of participants available, only the items presented in the success condition were retained. The two stimulus sets are presented in Appendix B.

In the multidimensional technique, each item is compared with every other item in the stimulus set. This resulted in 300 different comparisons for

the 25 items. Due to the length of such a questionnaire, the 300 comparisons in each stimulus set were divided into six separate forms. The forms were constructed to ensure overlap of comparisons between the six groups. As a result, every comparison was part of three different forms and each form consisted of 150 comparisons.

Procedure

The laypersons were assessed individually. After arrival in the laboratory, participants were given the questionnaire and were told that the purpose of the study was to examine people's idea of memory. They were asked to make comparisons between pairs of items on the degree of perceived similarity between the items. Participants answered on a 9-point scale that ranged from not at all similar (1) to very similar (9). Participants were allowed to work at their own pace and all of them completed the ratings within 50 minutes. They were debriefed after they had completed their ratings.

Questionnaires were mailed to publishing researchers in the field of memory and cognition. In a cover letter, they were informed of the importance of their responses and were asked to assist in the research. Researchers who had not returned the questionnaire in three weeks were sent a reminder letter requesting their assistance once again. Researchers were sent a summary of the results after all data had been analyzed. A similar procedure was conducted for the practitioners' group. The practitioners solicited for the research were psychologists, psychiatrists, and neurologists treating patients with memory problems.

Results and Discussion

The first question addressed in this study was whether laypersons and memory experts have different conceptions of memory. A second question addressed what memory dimensions are perceived to be relevant by laypersons and experts.

In this study, it was assumed that the set of comparison items captured the various dimensions and were primarily or remotely associated with a memory concept. Although this may not be an exhaustive set of dimensions, it was nonetheless valid on the grounds that participants had rated the 25 items as memory relevant in the previous two studies. The items were derived from known memory and metamemory questionnaires, and were similar to items freely generated by laypersons in Study 1.

The method chosen to study the stimulus sets was multidimensional scaling (MDS). Although other multivariate techniques such as factor analysis can be used, MDS has several advantages. First, recruiting a sufficient number of participants to complete a factor analysis was prohibitive, especially in the memory experts' groups.

Second, MDS is simpler to interpret than factor analysis because it is based on distances between points rather than angles between vectors. Therefore, actual similarity distances can be graphically presented. In addition, MDS does not rely on the assumption of linear relationships between variables, and MDS does not require a priori knowledge of the attributes to be examined (Schiffman, Reynolds, & Young, 1981). Finally, MDS aims to discover a structure independent of the researcher's design or

categorization scheme (Sedlak, 1979). The MDS method has been successfully applied in areas such as the understanding of moral development (Sedlak, 1979), and the conceptualizations of power strategies (Falbo, 1977).

A symmetric similarity matrix was constructed for the two stimulus sets in the groups of laypersons and researchers. The group of practitioners completed the second set of the stimulus items (Set B) only. Therefore, five MDS analyses were performed, two each for the laypersons and researchers and one for the practitioners. In each analysis, solutions in two to four dimensions were obtained. The amount of stress in the solution and the amount of variance accounted for in each solution is presented in Table 4.

In MDS analysis, interpretation of the solution is based on the minimal number of dimensions, that is, the dimension that accounted for the largest amount of variance but not appreciably improved by additional dimensions. Also, the least amount of stress should help determine the dimension used for interpretation. Stress is the measure that showed how far the data deviated from the model proposed by the analysis. Although no test of significance was performed on the significant increase in variance and significant reduction of stress, past research (e.g., Falbo, 1977; Sedlak, 1979) has utilized the method of comparing percentage increase in variance accounted for and percentage decrease in stress as dimensionality was increased.

For the group of laypersons, both sets of items had the largest increase in variance when dimensions were increased from two to three. Also, stress was appreciably lower when dimensionality was increased to three. The

Table 4

Stress and variance accounted for by MDS solutions for the laypersons' and memory experts' similarity score

	Stress Dimension			Variance Dimension		
	2	3	4	2	3	4
Layperson Set A	.27	.19	.15	.61	.71	.76
Set B	.26	.19	.15	.65	.74	.79
Researcher Set A	.26	.19	.14	.67	.74	.81
Set B	.24	.18	.13	.74	.80	.84
Practitioner Set B	.30	.20	.16	.51	.66	.77

Note. The smaller the stress value the better the fit of the data to the model. The larger the amount of variance accounted for the better the fit of the data to the model.

fourth dimension did not greatly improve the amount of variance accounted for or reduced the stress in the model. A similar pattern of results was found for the groups of researchers and practitioners. Therefore, a three dimension solution was selected for interpretation. It should be noted that similar to other interpretive techniques such as factor and cluster analyses, MDS relies heavily on the researcher's interpretation of the stimulus configurations and statistical comparisons are often lacking (e.g., Sedlak, 1979).

Figures 1 and 2 presented the 3-dimension solutions between laypersons and researchers for stimulus set A. The configurations between the two groups appeared to be different. For the laypersons, dimension 1 is interpreted to be a language versus a non-language dimension. This

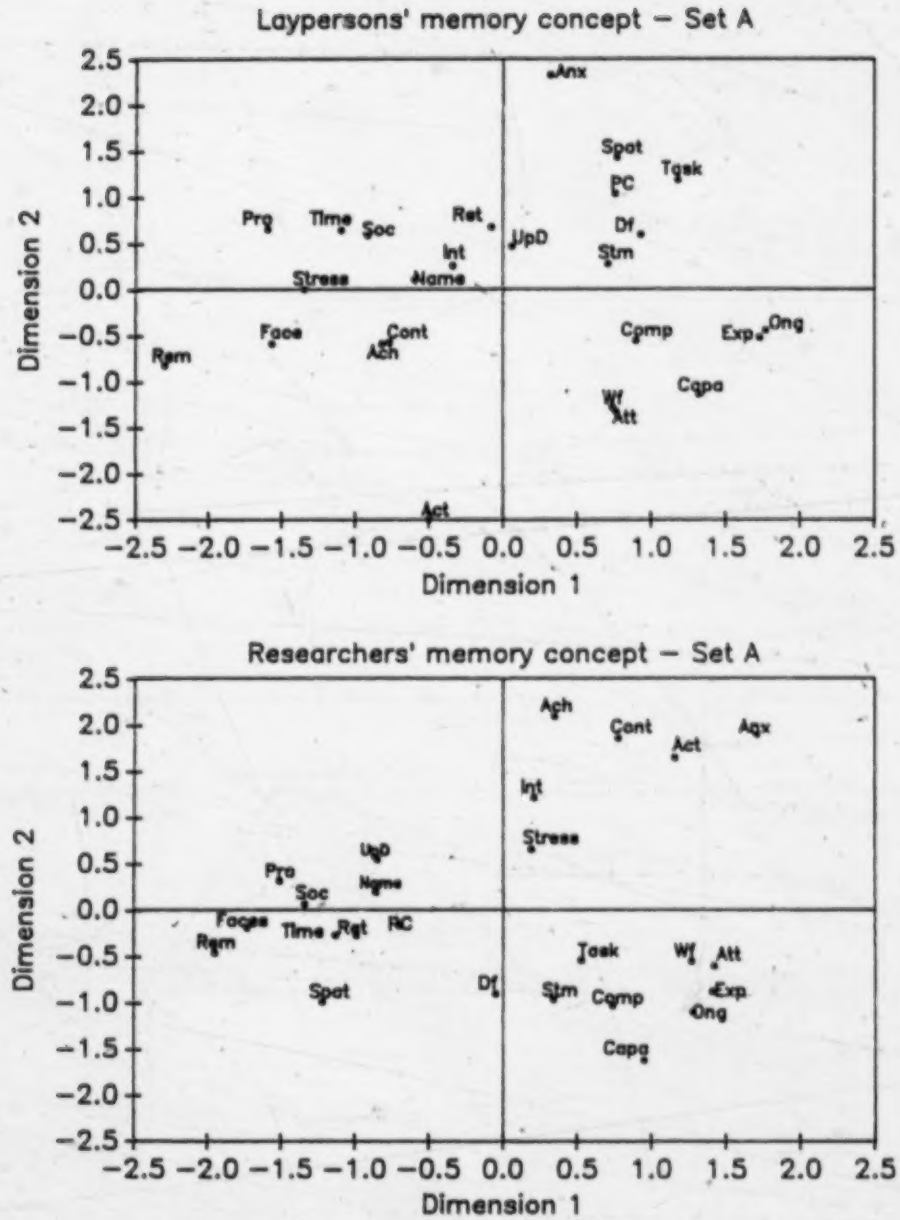

Figure 1. Laypersons' versus researchers' memory concept - Set A Dimensions 1 and 2

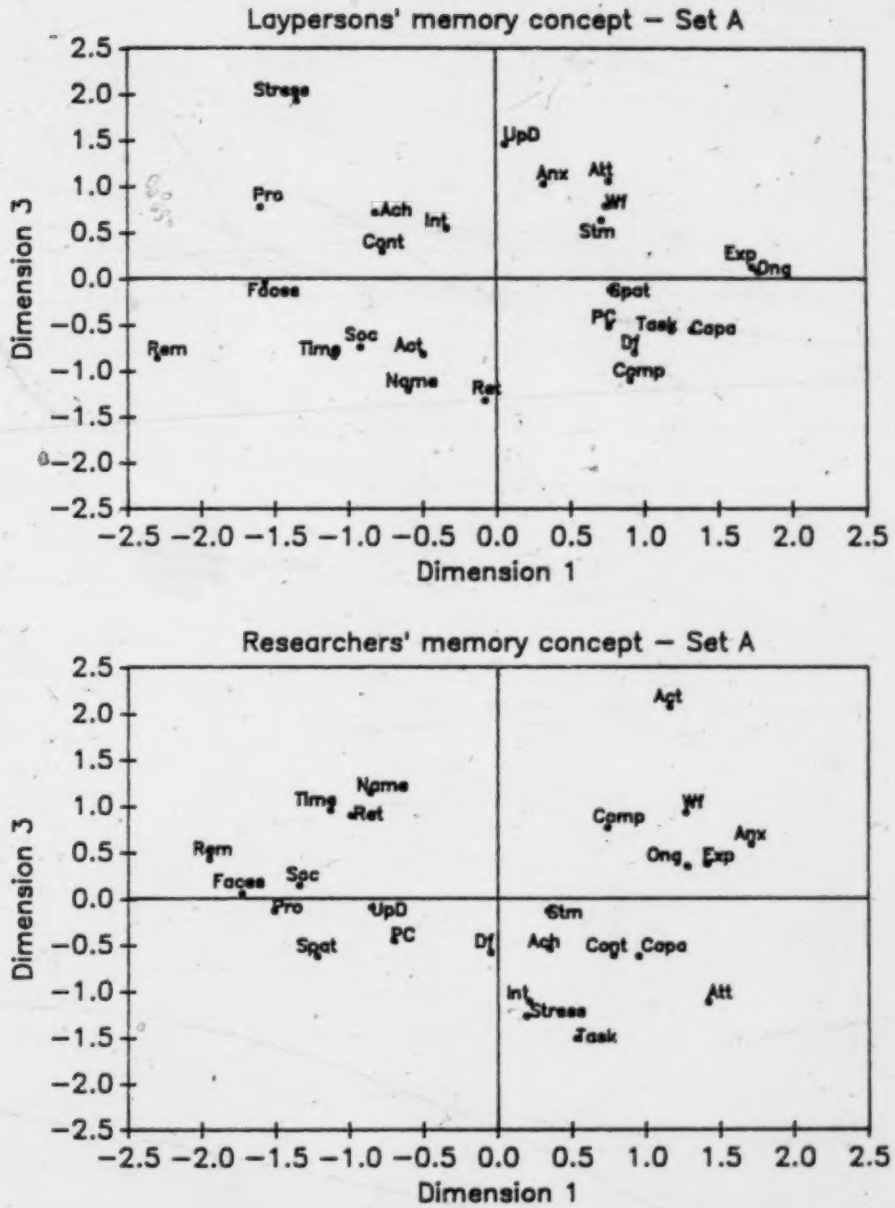

Figure 2. Laypersons' versus researchers' memory concept - Set A Dimensions 1 and 3

dimension identified activities ranging from those that require a person to communicate (e.g., expressive, comprehension, word finding) to activities that involve non-verbal components (e.g., faces, remote remembering). Dimension 1, as indicated by researchers is interpreted as a process versus content dimension. The cluster of items that identified memory processes includes attention, capacity, short-term memory, expressive language, ongoing activities, and comprehension. These items emphasized the processing of information in contrast to more content relevant items. For example, remembering faces, remote remembering, prospective remembering, and sources of memory information described memory content. It should be noted that the clustering of items for the researchers is better grouped and defined than that of the laypersons. The configuration from the laypersons appeared to be more varied and similarity distances are relatively more scattered.

The second dimension is interpreted as the process/content dimension for the laypersons. Once again, the cluster of items on the dimension is scattered but tends to identify memory process items (e.g., comprehension, word finding, attention, capacity, expressive language, and ongoing activities) versus memory content items (e.g., remote remembering, faces, prospective remembering, time). The researchers' similarity judgments on Dimension 2 are interpreted as an affect/non-affect variable. The achievement, control, activities, anxiety, intent, and stress items are clustered on the dimension as affect variables related to memory. Such variables identified the concerns people have about their memory. Again, the memory researchers provided

better clustering of the items than did the laypersons.

For the laypersons, dimension 3 is interpreted as the memory affect dimension whereas the third dimension is interpreted as a language dimension for the researchers. It is interesting to note that the same three dimensions were found for both groups. However, the cluster of items from the laypersons' judgments were more variable than those of the memory researchers. This is not surprising because researchers should have better structured and well-defined concepts than laypersons. Furthermore, researchers clustered the memory affect items whereas laypersons have scattered similar items throughout their configurations. This suggests that laypersons consider components like anxiety about memory or stress about memory when they rate an item. Researchers may be able to segregate such concerns in their similarity ratings.

For stimulus set B, the configurations derived from the laypersons and researchers are presented in Figures 3 and 4. Dimension 1 from the laypersons is interpreted as a process/content dimension. The cluster of items that emphasized memory processes includes attention, ongoing activities, capacity, comprehension, and expressive language. The cluster of items that emphasized memory content includes remote remembering, prospective remembering, retrospective remembering, and name remembering. In contrast to Set A, there were a few discrepant items in the memory content and process clusters. For example, word finding, task, direction following, and short-term memory were not clustered with the other memory process items. In addition, items such as visuo-spatial, source of

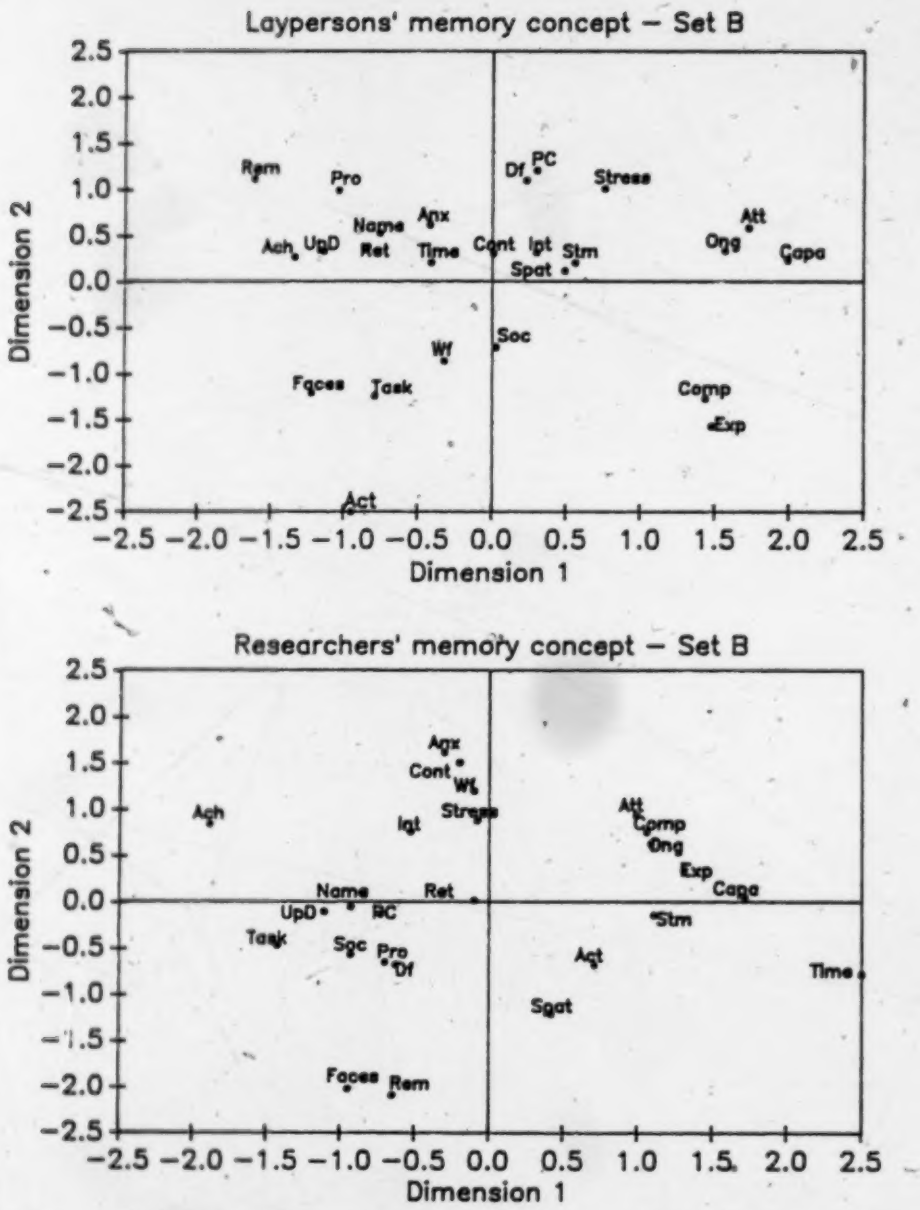

Figure 3. Laypersons' versus researchers' memory concept - Set B Dimensions 1 and 2

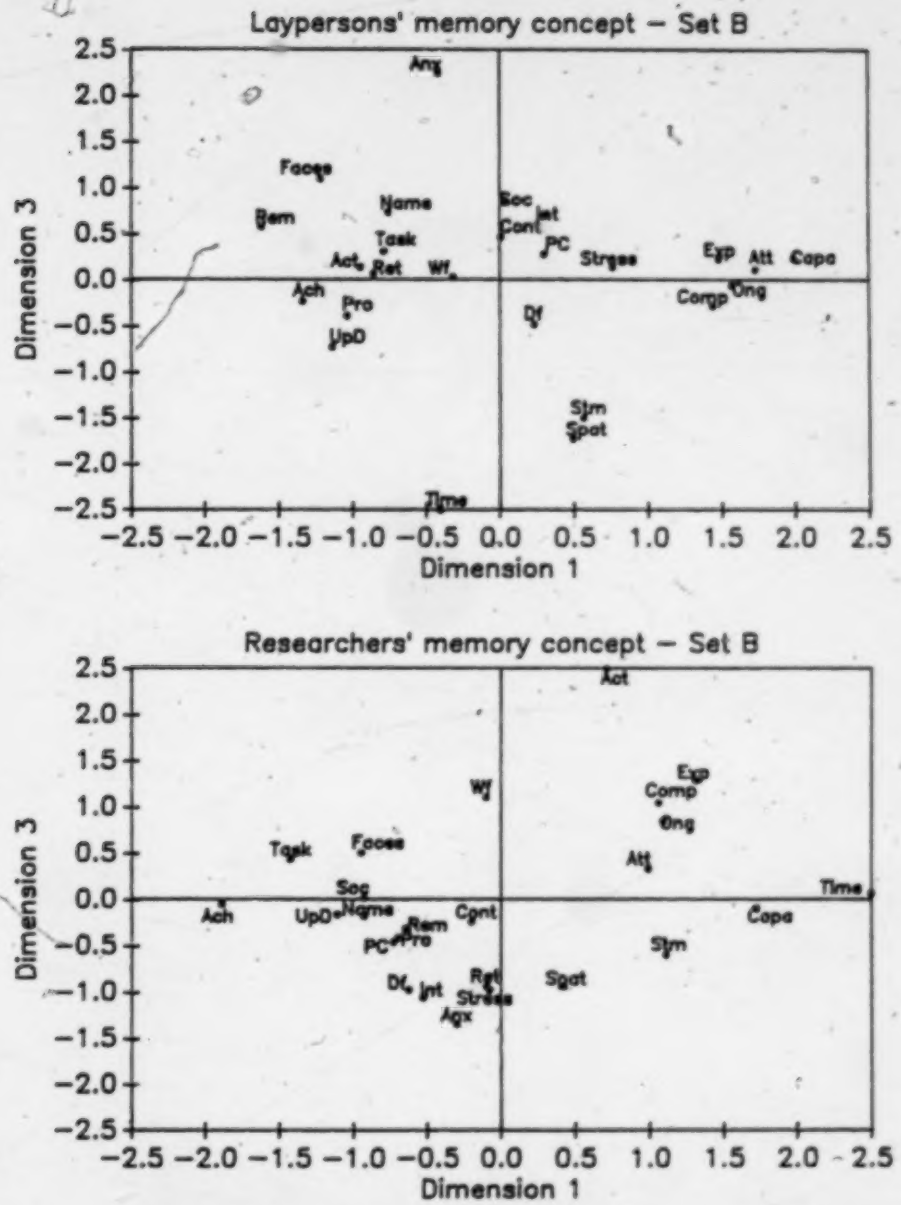

Figure 4. Laypersons' versus researchers' memory concept - Set B Dimensions 1 and 3

remembering, and prospective content are not well arranged with the other memory content items. Although there were item exceptions in the clusters, the general process/content dimension seems to be a reasonable interpretation for both Set A and Set B.

A similar process/content dimension is found for the researchers. Items like attention, comprehension, ongoing activities, expressive language, capacity, short-term memory again are well clustered as a memory process dimension. The exceptions to this cluster included task and word finding items. The task item (e.g., interesting facts are easier to remember than facts that are not) is associated more closely with memory content items whereas word finding is grouped with the affect items. The memory content cluster included updating, name, prospective, and retrospective remembering, prospective content, and source of remembering. Items like remote remembering and remembering faces are loosely associated with memory content but can be considered as part of the cluster. The major discrepancy with the memory content cluster was the item on remembering time (i.e., able to estimate time accurately) item that researchers rated as more relevant to memory processes than to memory content. Overall, compared to the laypersons, researchers provided more cohesive clusters of the items.

Dimension 2 for the laypersons is interpreted as a language (e.g., comprehension, expressive) versus non-language (e.g., remote remembering, prospective remembering) dimension. The major discrepancy with the dimension is the location of remembering names and faces in the configuration. Remembering names appeared to be associated with the other

non-language items whereas remembering faces is associated with language related items. Dimension 2 is interpreted as affect (e.g., stress, anxiety about memory) versus non-affect (e.g., remembering faces, remote remembering, visuo-spatial remembering). The major discrepancies were the word finding item that clustered strongly and the achievement item that clustered weakly with the memory affect items.

Dimension 3 is interpreted as memory affect/non-affect for the laypersons although the affect items are more widely scattered throughout the configuration. The third dimension is interpreted as language/non-language for the memory researchers with word finding weakly related to the language cluster. Stimulus Set B replicated the type of dimensions found in Set A although the exact configurations were different between the two sets.

The practitioners completed only Set B of the stimulus materials. The configurations derived are presented in Figure 5.. Dimension 1 is interpreted as a memory process (e.g., attention, capacity) versus a memory content variable (e.g., prospective remembering, name). The second dimension is interpreted as a language (e.g., comprehension, expressive language) versus a non-language variable (e.g., remote remembering, faces, visuo-spatial). The cluster of language items are not as well grouped as those of researchers with items such as time and ongoing activities associated with the language variable. Finally, Dimension 3 is interpreted as a memory affect/non-affect variable. People's concerns about their memory (e.g., achievement, anxiety, control) are contrasted against memory non-affect

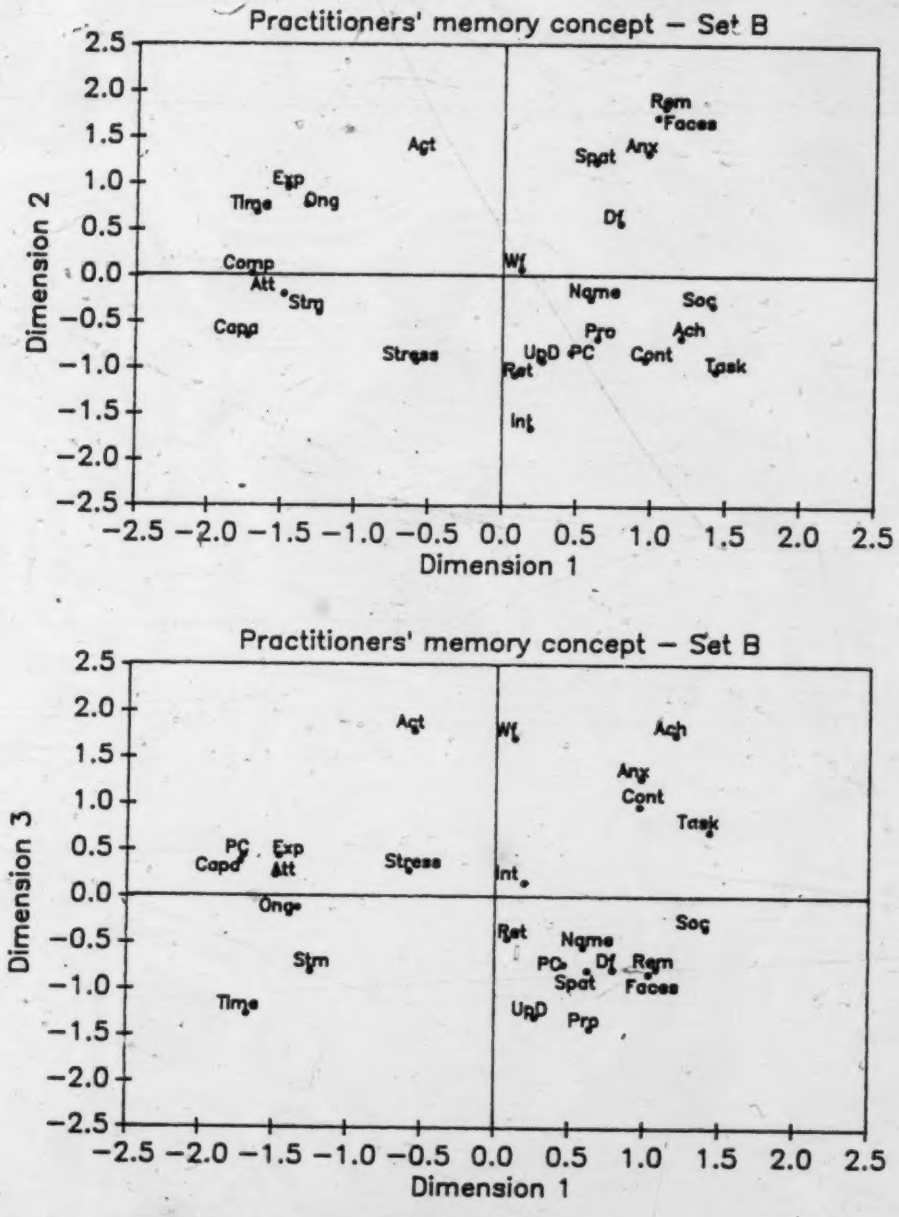

Figure 5. Practitioners' memory concept - Set B
Dimensions 1 and 2; Dimensions 1 and 3

components (e.g., updating information, prospective remembering). However, there were some discrepancies with the affect items such as stress and intent that are more weakly related with the other memory affect items.

Once again, dimensions similar to the laypersons and researchers responses are found in the practitioners' group. However, the MDS configurations were different between this group and the other two groups. The practitioners' dimensions are based on more scattered cluster of items than are those for the researchers. In particular, the items that identified memory affect for researchers are scattered throughout the configurations for practitioners. This suggested a difference in the perceptions of relevant components for items between researchers and practitioners. From the configurations, it is apparent that the researchers' concepts are best defined and most easily interpreted. This is expected because researchers in the memory area should have well developed and organized conceptualizations.

The cohesion of the grouped items forming each dimension is shown in the subject weights. As presented in Table 5, the higher the weighted value the more significant the dimension is to the group. In Set A, laypersons weighted the language dimension more highly than the others whereas the researchers weighted the memory relevance/irrelevance dimension more highly. It is probable that the researchers perceived some of the items (e.g., anxiety, stress, control) as distinctively non-memory and therefore grouped the respective items.

Table 5 also presented the subject weights for Set B. In this case, the laypersons and researchers had higher weighted values for

Table 5

Importance of each dimension to the laypersons', researchers', and practitioners' groups as measured by subject weights.

	Subject Weights		
	Dimension		
	1	2	3
Laypersons			
Set A	.50	.32	.43
Set B	.45	.44	.48
Researchers			
Set A	.50	.57	.27
Set B	.58	.49	.41
Practitioners			
Set B	.40	.47	.46

Note. Higher subject weight values indicate more importance of that dimension to the particular group.

Dimension 1 whereas the practitioners had weighted Dimension 2 more highly. These dimensions corresponded to a memory process versus content variable for the laypersons and researchers and the language variable for practitioners.

In summary, it appeared that laypersons and practitioners have less well-defined dimensions than do researchers. From the configurations it could be seen that the laypersons have less well clustered items. However, it is possible that laypersons have difficulty separating the different components of memory. For example, it suggested that laypersons perceived the anxiety about memory component in every item. Therefore, their memory affect items were not well clustered but were scattered throughout the configurations. This similar conceptualization was found in the practitioners

ratings. In contrast, items rated by th the researchers provided better clustering than did those in the other two groups.

From such results, it appears that researchers, due to their training and expertise in the memory area, have considered each of the items on the basis of only one dimension. Researchers may have deliberately separated the different components of memory. For example, once an item is identified as relevant to short-term memory functions, the researchers may have consciously discounted the memory affect component associated with that particular item. Consequently, their groupings of items are more distinct than are the groupings of the laypersons and practitioners. These latter two groups may not have the expertise to consider only one dimension for each of the presented items. In fact, their configurations suggest that the memory affect component (e.g., anxiety about memory, control, stress) is important to all of their evaluations. That is, laypersons and practitioners regard the dimension as integral to their assessment of the items.

Study 5

In the first four studies, the major independent variable was the type of cognitive tasks involved. However, an implicit memory concept may be influenced by variables other than task variables. The disposition of the person and the situation surrounding the activity are two aspects of the context that may influence people's perceptions. If a person's performance is influenced by the situation, then the success or failure outcome on a task would be considered less an index of the person's memory ability. However, if dispositional attributions are inferred, then the success or failure outcome

on a task cannot be discounted by the situational information. In this case, the success or failure performance would be considered an index of the person's memory ability (e.g., good or poor memory ability, respectively). For example, if a perceiver learned that a person failed on a task and that most other people also failed (high consensus), this would prompt a situational attribution (Kelley, 1967). The perceiver would not consider the performance on the task as an indicator of good or poor memory ability in the person. Alternatively, if a person failed on a memory task whereas other people succeeded (low consensus), this would prompt a dispositional attribution. The inference made is that the task is a good indicator of poor memory ability in the person. Different combinations of situational and dispositional variables would be expected to affect the memory concept, which, in turn would influence the attributions made. These variables are systematically presented in Kelley's (1967) covariation model of causal attribution.

According to the covariation model, people perceive the importance of situational or dispositional factors as dependent on the combinations of consensus, distinctiveness, and consistency types of information received. Consensus information refers to situations where other people behaved in a manner similar to that of the actor (high consensus) or did not behave in a manner similar to that of actor (low consensus). Distinctiveness information refers to cases where the actor reacts in a manner only toward the particular stimulus (high distinctiveness) or where the actor behaves similarly toward other similar stimuli (low distinctiveness). Finally, consistency information

refers to behavior variation over time or modality, that is, cases where an actor behaves in a similar manner toward the stimulus over time or the actor behaves in this manner toward the stimulus regardless of where it is encountered (high consistency). Consistency also refers to situations where the actor behaves differently toward the stimulus over time and also across contexts (low consistency). Kelley suggests that a perceiver, once presented with the combinations of the three types of information, will make rational causal inferences. For example, perceivers will make attributions toward the stimulus when high consensus, high distinctiveness, and high consistency (HHH) types of information are presented. A dispositional attribution will result when low consensus, low distinctiveness, and high consistency (LLH) types of information are presented.

Research on the covariation model has shown that people's perceptions of situational or dispositional influences may be affected by a variety of information sources. But it is unclear what impact the information sources have on the perceptions of memory performance. Past memory performance research (Banziger & Drevenstedt, 1982; Prohaska, Parham, & Teitelman, 1984; Reno, 1979) has found that young people's successful memory performance is attributed to their ability (dispositional) and poor memory performance is attributed to task variables (situational). However, little is known about how covariation information influence people's perceptions of memory ability.

If information is provided that a young person remembered names, it would be predicted from past research (e.g., Lachman & McArthur, 1986)

that a dispositional attribution about his or her ability would be made by a perceiver. If information is presented that most other people succeeded at remembering names (high consensus), that the person remembered only names (high distinctiveness), and that the person remembered names all of the time regardless of where he/she is (high consistency), attribution theory would predict a strong situational attribution. Therefore, when task (remembering names) and covariation information are combined, the task variable may be countered by covariation resulting in a situational attribution. However, if the task information is critical to people's perceptions of ability, covariation information would be discounted and a dispositional attribution would result.

Six different cognitive tasks were examined in the fifth study. Three of the tasks were those considered by laypersons in Study 3 as prototypic of memory whereas the other three were those considered as least prototypic. Each cognitive task was studied in a 2(Success versus Failure Performance) X 2(HHH versus LLH Pattern of Covariation Information) factorial design. The HHH pattern involved high consensus, high distinctiveness, and high consistency information. The LLH pattern involved low consensus, low distinctiveness, and high consistency information. Due to attributional complexity when different patterns of information are presented, only the HHH and LLH patterns were examined.

From the covariation model of causal attribution, it was predicted that the HHH pattern would lead to a strong situational attribution regardless of performance (success or failure) whereas the LLH pattern would lead to a

strong dispositional attribution. However, when the performance variable is combined with covariation information, a different pattern of results was expected. Success performance under the HHH pattern would be attributed less situationally than the failure performance condition whereas attributions of success performance under the LLH pattern would be strongly dispositional. Successful performance was expected to elicit dispositional attributions that would decrease or increase the impact of HHH and LLH covariation information, respectively. Finally, it was anticipated that the perceiver would infer more memory ability or disability in a person when dispositional attributions rather than when situational attributions are formed.

The attributions formed may also affect the perception of whether a task is highly or poorly related to memory. Dispositional attributions would lead to perceptions of tasks as more related to memory whereas situational attributions would lead to perceptions of tasks as less related to memory. This was predicted because dispositional attributions implicate ability in people. Tasks perceived as poorly related to memory subsequently may be rated as more related to memory when dispositional attributions were formed.

Method

Subjects

The subjects were students enrolled in introductory psychology courses at the University of Alberta. They participated in this study as an option in partial fulfillment of their course requirements. Ninety-six male

and female students were randomly assigned to the conditions of a 2(HHH versus LLH Information Pattern) X 2(High versus Low Memory Related Scenarios) X 2(Success versus Failure Performance) factorial design. In addition, there were three replications for the high versus low memory related scenarios. Each participant was asked to respond to questions on four different scenarios.

Procedure

Participants were tested in groups of 5 to 8. After they had arrived in the laboratory, they were told that their task was to examine how different types of information would affect impression formation. Participants were asked to read and then to answer questions following each scenario. After they have completed all four scenarios, the participants were debriefed.

Memory Relatedness Scenarios

Six scenarios were used in the study. Three of these pertained to high memory related and the other three to low memory related manipulations. These tasks were selected from the high versus low rated items found in Study 3. The three replications for the high memory related scenarios were: Kelly has no difficulty remembering appointments (prospective remembering), Robin is able to remember friends from childhood (remote remembering), and Laurie is able to remember names of people a few days after first introduction (remembering names).

The three replications for the low memory related scenarios were: Pat is able to follow a storyline when reading a newspaper (comprehension), Leslie is able to find the proper words to use when writing (word finding),

and Sandy is able to describe something while it is happening, for example, a hockey game (expressive). Although items involving the task irrelevant aspects of memory (e.g., anxiety about memory, memory achievement) were rated as more non-memory items in previous studies, they were not used because we were interested in the success or failure task situations. All information relevant to the scenarios is presented in Appendix C.

Information pattern manipulation

The HHH pattern presented the information that other people acted similarly to the target person (high consensus), the target person never acted this way with similar stimulus activities (high distinctiveness), and the target person acted similarly in this condition consistently over time (high consistency). For example, one HHH pattern presented the information that: According to a survey taken, most people also experience little difficulty remembering appointments (high consensus); in general, Kelly usually has trouble remembering other types of things, for example, sending cards for birthdays or anniversaries on time (high distinctiveness); and Kelly has no difficulty remembering appointments regardless of when Kelly is asked to remember such information (high consistency).

The LLH pattern presented the information that other people acted differently from the target person (low consensus), the target person acted similarly with other stimulus activities (low distinctiveness), and the target person acted this way toward the situation consistently over time (high consistency). For example, one LLH pattern presented the information that: According to a survey taken, most people experience difficulty remembering

appointments (low consensus); in general, Kelly usually remembers other types of things, for example, send cards for birthdays or anniversaries on time (low distinctiveness); and Kelly has no difficulty remembering appointments regardless of when Kelly is asked to remember such information (high consistency).

Outcome manipulation

In the success performance condition, the target person was able to perform the task, that is, Kelly has no difficulty remembering appointments. In the failure performance condition, the target person had difficulty performing the task, that is, Kelly has difficulty remembering appointments.

Results and Discussion

Each of the 96 participants made attribution judgments on four different scenarios. This resulted in 16 observations for each of the 24 scenarios.

Manipulation Checks

Scenario replications. Separate analyses of variance (ANOVA) were conducted to examine replication effects. This resulted in two separate 2(HHH versus LLH Information Pattern) X 3(Scenarios) X 2(Success versus Failure Performance) between groups analyses.

The first ANOVA examined replication effects for the three high memory related scenarios. The only scenario main effect found was for the question: To what extent is the activity (prospective remembering or remote remembering or remembering names) a good or poor example of memory to you? Participants answered on a 9-point scale from a poor example of

memory (1) to good example of memory (9). The analysis indicated that participants rated remote remembering as the least representative sample of memory, $F(2, 180) = 3.03$, $p < .05$. The mean ratings for remote remembering, prospective remembering and remembering names were 6.00^{b}, 6.34^{ab}, and 6.80^{a}, respectively. The mean ratings with different superscripts differ at alpha less than .05 by Newman-Keuls comparisons.

For the three low memory related scenarios, a main effect was found for the question: To what extent is the activity (comprehension or word finding or expressive) a good or poor example of memory to you? The result indicated that the expressive task was rated as the least representative example of memory, $F(2, 180) = 10.95$, $p < .001$. The mean ratings for expressive, comprehension and word finding were 3.97^{b}, 5.63^{a}, and 5.47^{a}, respectively. The mean ratings with different superscripts differ at alpha less than .05 by Newman-Keuls comparisons.

Although the two significant main effects were found, the trend of the mean ratings indicated that the three high memory related activities were rated as better memory examples than were the three low memory related ones. As a method of data reduction, the results from the three high memory related scenarios therefore can be combined to reflect the high memory related manipulation whereas the results from the three low memory related scenarios can be combined to reflect the low memory related manipulation.

To assess the combined memory concept manipulation effect, a 2(HHH versus LLH Information Pattern) X 2(High versus Low Memory Related Tasks) X 2(Success versus Failure Performances) ANOVA was

conducted on the question: To what extent is the activity a good or poor example of memory to you? Two main effects were found, one for information pattern, $F(1, 376) = 11.67$, $p < .001$, and one for memory relatedness, $F(1, 376) = 39.99$, $p < .001$. The mean ratings for the information pattern effect were 5.33 and 6.07 for the HHH and the LLH patterns, respectively. These data indicated that participants in the LLH pattern condition rated the tasks as more related to memory than participants receiving HHH information. The mean ratings for the memory relatedness effect were 6.38 and 5.02 for high memory related versus low memory related, respectively. This result indicated that the manipulation of the memory relatedness variable was successful.

There were two interaction effects associated with the memory example question. The first was a Memory Relatedness X Performance interaction, $F(1, 376) = 4.05$, $p < .05$. The mean ratings are presented in Table 6. The results indicated that high memory related tasks in the success condition were rated as better examples of memory than in the failure condition. There were no differences in the low memory related success or failure conditions. Also, success performance elicited ratings of better memory examples in the high memory related over low memory tasks. A similar result was found in the failure conditions where high memory related tasks were rated as better memory examples than low memory related tasks. The second effect was an Information Pattern X Memory Relatedness X Performance interaction, $F(1, 376) = 8.88$, $p < .05$. The mean ratings are presented in Table 7. The ratings indicated that people rated the best

Table 6

The mean ratings for memory examples manipulation check as a function of memory relatedness and performance

Memory Related	Performance: Success	Failure
High	6.77_a	5.99_b
Low	4.98_c	5.06_c

Note. Mean ratings with different subscripts differ at alpha less than .05 by Newman-Keuls. Higher numbers indicate better memory examples.

Table 7

The mean ratings for memory examples manipulation check as a function of information pattern, memory relatedness, and performance

HHH Pattern

Memory Related	Performance: Success	Failure
High	6.00_{bc}	5.81_{bc}
Low	5.06_{bcd}	4.46_d

LLH Pattern

Memory Related	Performance: Success	Failure
High	7.54_a	6.17_b
Low	4.90_{cd}	5.67_{bc}

Note. Mean ratings with different subscripts differ at alpha less than .05 by Newman-Keuls. Higher numbers indicate better memory examples.

memory examples when the target performed the high memory related act successfully in the LLH information pattern condition over those in the failure condition. There were no differences between the success or failure conditions of low memory related tasks. However, this was modified when the HHH pattern of information was presented. In this case, better memory examples were rated in the high memory related failure condition over the low memory related failure condition. Such results indicated that the information pattern influenced people's ratings of memory examples.

All of the main and interaction effects supported the contention that the memory manipulation was successful and that the three replications for the high memory related variable could be summed together. A parallel effect was found for the replications of the low memory related variable. Therefore, in subsequent analyses, the results of the replications were combined.

Information patterns. To check for consensus manipulation effects, participants were asked to what extent other people acted in a manner similar to that of the target person, on a 9-point scale from few others (1) to many others (9). A significant main effect for information pattern was found, $F(1, 376) = 547.09$, $p < .001$. The mean ratings were 7.22 and 2.79 for the HHH and LLH patterns, respectively. This indicated that participants rated many others to act in a manner similar to that of the target person under high consensus situations (HHH pattern). A memory related main effect was also found, $F(1, 376) = 4.35$, $p < .05$. This result indicated that people in memory related activities were rated as acting in a manner similar to others. The

mean ratings were 5.20 and 4.81 for high memory related and low memory related activities, respectively. Finally, there was a significant performance main effect, $F(1, 376) = 4.82$, $p < .05$. The mean ratings corresponding to success and failure performances were 5.21 and 4.80, respectively. This indicated that participants rated many others to have acted in a manner similar to that of the target person when performances were positive than when negative.

For the check on distinctiveness, participants were asked to what extent the target person acted in this manner only toward the particular stimulus. Again, participants answered on a 9-point scale from not at all (1) to very much (9). Analysis of variance indicated a distinctiveness main effect, $F(1, 376) = 53.42$, $p < .001$ with mean ratings of 4.89 and 3.27 for HHH versus LLH information patterns. There was also a memory relatedness main effect, $F(1, 376) = 3.92$, $p < .05$ with the mean ratings of 3.86 and 4.30 for the high and low memory related scenarios, respectively. This indicated that low memory related scenarios elicited more behavior distinctiveness ratings than high memory related ones. There was an performance main effect, $F(1, 376) = 119.68$, $p < .001$ with mean ratings of 5.29 and 2.87 for success versus failure performances. This indicated that success performances were rated as more distinctive than failure ones.

There were also several interaction effects associated with this question. There was an Information Pattern X Performance interaction, $F(1, 376) = 44.84$, $p < .001$. This result indicated that participants in the HHH success performance condition rated the target person to have acted more

distinctively than those in the failure condition. A similar pattern was found for the LLH conditions. However, people rated activities as more distinctive under the HHH in comparison to the LLH success conditions whereas no differences were found between HHH and LLH failure conditions. A Memory Relatedness X Performance interaction was found, $F(1, 376) = 10.59$, $p < .001$. This result indicated that participants in the low memory related success performance condition rated the target person to have behaved more distinctively than those in the failure condition. A similar pattern of results was found in the high memory related conditions. Also, low memory related tasks were rated as more distinctive than high memory related tasks under the success conditions but no differences were found in memory relatedness under the failure conditions. Finally, there was an Information Pattern X Memory Relatedness X Performance interaction effect, $F(1, 376) = 16.07$, $p < .001$. This result is consistent with the other findings where participants in the HHH, success condition rated the target person to have behaved most distinctively in comparison to the targets in the failure conditions. However, this was modified in the LLH conditions where successful low memory related behaviors were rated as more distinctive than all the other conditions under the LLH pattern. The mean ratings associated with these three interaction effects are presented in Tables 8, 9, and 10, respectively.

For the consistency information manipulation check, participants were asked to what extent the target person regularly acted in this manner. A 9-point answer scale was used from not at all regularly (1) to very regularly

Table 8

The mean ratings for distinctiveness manipulation check as a function of information pattern and performance

	Performance	
Pattern	Success	Failure
HHH	6.83_a	2.94_c
LLH	3.74_b	2.80_c

Note. Mean ratings with different subscripts differ at alpha less than .05 by Newman-Keuls. Higher numbers indicate more distinctiveness.

Table 9

The mean ratings for distinctiveness manipulation check as a function of memory relatedness and performance

	Performance	
Memory Related	Success	Failure
High	4.71_b	3.01_c
Low	5.87_a	2.73_c

Note. Mean ratings with different subscripts differ at alpha less than .05 by Newman-Keuls. Higher numbers indicate more distinctiveness.

Table 10

The mean ratings for distinctiveness manipulation check as a function of information pattern, memory relatedness, and performance

HHH Pattern

Memory Related	Performance: Success	Performance: Failure
High	6.77_a	2.71_c
Low	6.90_a	3.17_c

LLH Pattern

Memory Related	Performance: Success	Performance: Failure
High	2.65_c	3.31_c
Low	4.83_b	2.29_c

Note. Mean ratings with different subscripts differ at alpha less than .05 by Newman-Keuls. Higher numbers indicate more distinctiveness.

(9). A memory relatedness main effect was found, $F(1, 376) = 9.70$, $p < .05$ with mean ratings 7.74 and 7.09 for the high and low memory related tasks, respectively. Finally, an performance main effect was found, $F(1, 376) = 14.57$, $p < .001$. The mean ratings were 7.81 and 7.02 for success versus failure performances. Such results indicated that the consistency manipulation was successful because no differences were found between the HHH and LLH patterns.

All of the above manipulation checks revealed no major discrepancies to conflict with the proposed hypotheses.

Dispositional and Situational Attributions

The first attribution question examined the target person's personal responsibility for the act. Participants were asked to rate how important the target person's characteristics were in causing the particular act and answered on a 9-point scale that ranged from not at all (1) to extremely important (9). Analysis of variance yielded an information main effect, $F(1, 376) = 33.16$, $p < .001$, with the mean ratings of 5.91 and 7.04 for HHH and LLH patterns, respectively. This result indicated that participants in the LLH condition attributed the target person's action more to personal causes than did participants in the HHH condition. This finding is consistent with past research findings in causal attributions (e.g., Kelley, 1967; McArthur, 1972).

This analysis also yielded a performance main effect, $F(1, 376) = 3.96$, $p < .05$, with mean ratings of 6.67 and 6.28 for success and failure performances, respectively. This result indicated that participants in the success performance condition attributed the target person's behavior to

personal causes than those in the failure performance condition. This corresponded to earlier findings that success indicated an internal quality of memory ability. Finally, there were no significant interaction effects.

The second attribution item examined situational causes. Participants were asked how important situational causes were in causing the particular act, and responded on a 9-point scale that ranged from not at all (1) to extremely important (9). A significant information pattern main effect was found, $F(1, 376) = 26.62$, $p < .001$, with mean ratings of 5.28 and 3.99 for HHH and LLH patterns, respectively. This result indicated that participants in the HHH pattern attributed more situational effects on the behavior than did participants in the LLH condition. This finding is also congruent with traditional results showing that HHH information patterns elicited situational attributions whereas LLH information patterns elicited dispositional attributions (e.g., McArthur, 1972).

Finally, an Information Pattern X Memory Relatedness X Performance interaction was found, $F(1, 376) = 4.11$, $p < .05$. The results indicated that participants in the HHH, failure, low memory related condition attributed the act more situationally than those in the high memory related condition. However, there were no differences in situational attributions in the LLH conditions. The major attribution differences occurred in the failure, low memory related conditions between the HHH and LLH patterns. Participants in the HHH pattern attributed low memory related failure behaviors more to situational factors than participants in the LLH condition. Again, this finding is consistent with the dispositional attribution results

Table 11

The mean ratings for situational attributions as a function of information pattern, memory relatedness, and performance

HHH Pattern

Memory Related	Performance: Success	Performance: Failure
High	5.35_{ab}	4.63_{bc}
Low	5.00_{abc}	6.13_{a}

LLH Pattern

Memory Related	Performance: Success	Performance: Failure
High	4.25_{bc}	4.01_{bc}
Low	4.02_{bc}	3.65_{c}

Note. Mean ratings with different subscripts differ at alpha less than .05 by Newman-Keuls. Higher numbers indicate more situational attributions.

indicating that information pattern and performance strongly influence people's attributions. The mean ratings are presented in Table 11.

The causal attribution results replicated past (e.g., McArthur, 1972) information pattern findings. Thus, the HHH patterns prompted situational attributions whereas the LLH patterns generated dispositional attributions. Furthermore, the type of performance influenced the attributions made. Participants attributed personal responsibility for success than for failure performances. Stronger situational attributions are made when the HHH pattern combined with failure performance. However, a high memory

related task resulted in less situational inferences. All of the attribution findings supported the a priori expectations.

Memory Concept Variables

A set of questions assessed the perception of the target person's memory ability and skills. In the first question, participants were asked whether performing the particular activity was a result of the target person's memory ability, answered on a 9-point scale that ranged from not at all (1) to very much (9). There was an information pattern main effect, $F(1, 376) = 19.50$, $p < .001$, with mean ratings of 5.06 and 6.04 for the HHH and LLH patterns, respectively. This result indicated that receiving information that the target person's act was not part of the norm (low consensus), that the target person acted similarly toward other related stimuli (low distinctiveness), and that the target person acted this way toward this stimulus all the time (high consistency) resulted in ratings of high memory ability. This was as predicted and was congruent with a dispositional attribution under the LLH information pattern. This result suggests that more memory ability is attributed to the target person when dispositional attributions are made.

A memory relatedness main effect also was found, $F(1, 376) = 50.99$, $p < .001$. The mean ratings were 6.34 and 4.76 for the high versus low memory related activities, respectively. This indicated that participants attributed more memory abilities in targets performing high memory related activities. Once again, this finding is consistent with previous results that indicated high memory related activities resulted in less situational

inferences. In addition, people rated high memory related activities as better examples of memory than low memory related activities.

Finally, there was a performance main effect, $F(1, 376) = 5.52$, $p < .05$. The mean ratings for success and failure performances were 5.81 and 5.29, respectively. This result indicated that participants inferred more memory ability in those who succeeded at their task. This finding was consistent with past results that indicated success is often attributed dispositionally (e.g., Weiner, 1979). No significant interactions were found.

A second question assessed participants' ratings of skill in target persons. Participants were asked to what extent the target compared to others, was skilled at the particular task on a 9-point scale from not at all (1) to very skilled (9). First, there was a significant performance main effect, $F(1, 376) = 326.07$, $p < .001$. This result indicated that more skill was inferred when the target person succeeded at the task than when he/she did not. This was supported by the mean ratings of 6.55 and 3.44 for success versus failure performances.

There was one Information Pattern X Performance interaction effect, $F(1, 376) = 176.32$, $p < .001$. The mean ratings are presented in Table 12. This result indicated that greater skill was inferred by those in the LLH than HHH success condition but greater skill was inferred in the HHH than LLH failure condition. This finding indicated that when personal responsibility for situations is expected (e.g., LLH patterns eliciting dispositional attributions) and the person fails, it is detrimental to the perception of his/her memory abilities. This effect is less pronounced when personal responsibility is

Table 12

The mean ratings for perceived skill as a function of information pattern and performance

Pattern	Performance Success	Failure
HHH	5.38_b	4.55_c
LLH	7.72_a	2.32_d

Note. Mean ratings with different subscripts differ at alpha less .05 by Newman-Keuls. Higher numbers indicate more perceived skill in the target persons.

not expected (e.g., HHH patterns eliciting situational attributions).

A final question assessed participants' attributions of memory ability in the targets. They were asked to what extent the target person's act is a good or poor indicator of memory ability. Once again, participants answered on a 9-point scale from poor indicator (1) to good indicator (9). There was an information pattern main effect, $F(1, 376) = 8.30$, $p < .05$, the mean ratings were 5.01 and 5.64 for HHH versus LLH patterns. This result indicated that more memory ability was inferred for those in the LLH condition. This result was expected where the LLH pattern, suggesting dispositional attributions, elicited an inference of ability in target persons.

There was also a memory relatedness main effect, $F(1, 376) = 32.65$, $p < .001$. The mean ratings were 5.94 and 4.70 for high versus low memory related conditions, respectively. This indicated that more memory ability was inferred under memory related conditions. Finally, there was a performance

main effect, $F(1, 376) = 23.99$, $p < .001$. The mean ratings were 5.85 and 4.79 for success versus failure performances, respectively, indicating that positive performances were rated to be related to more memory abilities in the targets. No significant interaction effects were found for the question.

All of the memory concept questions confirmed the predictions that more memory ability is inferred when dispositional attributions are made. The results suggest that people are influenced by contextual variables such as the situations surrounding the memory activity.

General Discussion

The results from the first three studies of the series indicated that there may be a prototypic structure to laypersons' memory concept. This is indicated in the participants' freely-listed responses and in their labelling and rating of stimulus items. When presented with the super-ordinate category of "Memory", laypersons listed the more mid- and lower-level memory subcategories. In accordance with the prototypic analysis, people listed items that ranged from closely to weakly memory associated items. Such results indicated that laypersons share common attributes of the memory concept. For example, there was a gradation from more frequently listed items (e.g., remember, short- and long-term memory) to more idiosyncratic associations with the memory concept (e.g., personality, logic). The more frequently listed exemplars were general labels representing memory processing (e.g., remember, recollect, short-term memory). These processing variables are common topics in introductory cognitive psychology textbooks (e.g., Anderson, 1980). However, these general labels do not correspond with the more specialized topics in cognitive research (e.g., semantic processing, interference effects). This indicated that laypersons may not readily associate research generated terminology with their concept of memory, or they are merely concerned with more everyday uses of memory (e.g., remembering what to buy at a store).

The less frequently generated responses appeared to be more memory content oriented. For example, most of these items are concerned with the type of information people often retrieve from memory (e.g., phone numbers,

names). In addition, these content oriented responses may depend on each individual's experiences with their own memory. If an individual has had problems retrieving names, he/she may consider names as associated to memory more so than an individual who has had problems retrieving phone numbers from memory. In Sehulster's (1981) formulation of a self-theory of memory, it was assumed that each individual collects memory experiences and gathers evidence about his/her own memory ability. Accordingly, each individual's encounters may alter that person's memory concept. As a result, lay people have shared memory that is centrally related to memory processing dimensions (e.g., remember, recall) with more weakly related dimensions related to memory content. Individuals' personal experiences with memory modify which memory content dimension is part of their memory concept.

The second study further examined the laypersons' prototypic memory structure with a labelling procedure. The assumption underlying such a procedure is that the items will be labelled with the category based on people's implicit concept. Whereas Study 1 was a "top-down" procedure (i.e., presenting the super-ordinate category and asking for its related attributes), the second study was a "bottom-up" procedure (i.e., providing individuals with the lower level attributes and asking them to provide the super-ordinate category). The results from Study 2 again indicated that people have a shared concept of memory because they provided a majority of items with the memory label. It is understandable that not all of the items received the memory label nor was there any one item that received the memory label from 100% of the participants. The reason for such less than perfect

labelling may be a result of slight deviations in people's concept. As noted in Study 1, although people have shared memory dimensions there also existed idiosyncratic responses. It is these distinctive responses that may have resulted in lower consensus in the labels provided by participants. However, even when items were not labelled with the "Memory" category, an examination of Appendix A.2 indicated that most of the alternative labels generated were mid-level subcategories (e.g., short-term memory, long-term memory, recall). Therefore, although the super-ordinate "Memory" label was not used, some derivative of mid-level subcategories was generated. This indicated a weaker relationship between these distinctive items and the "Memory" super-ordinate category but a stronger association between the items and the mid-level subcategories.

The implicit concept of memory was further examined in Study 3. Individuals were asked to rate the extent to which items belonged under a memory category. Once again, the assumption was that based on people's memory concept, exemplars would be rated as better memory examples than those less closely associated with people's memory concept. The results indicated that there is a gradation from best to worst examples of memory. More significantly, the memory concept was affected by the positively or negatively worded items. For example, asking whether an individual "can remember people's names" versus whether he/she "have difficulty remembering names" elicited different responses. The ability to remember names is the expected norm whereas forgetting people's names may be so unexpected that this dimension is considered as vital to people's perceptions

of the makings of good memory ability.

Although laypersons differentially rated the positively and negatively worded items as examples of memory, they were consistent on several subcategories. For example, there were few discrepancies in the ratings of expressive language, word finding, locus of control, memory achievement, attention, memory anxiety, and memory activities for the two conditions. These subcategories were also labelled as poor indicators of memory in Study 2. Although there were variations in what people consider as memory relevant, they have a good concept of what is considered as weakly related to memory.

In addition, requesting laypersons to label exemplars may elicit different processes from those that ask them to rate exemplars as instances of memory. For example, results from Study 3 indicated that people rated short-term memory items as best examples of memory in the positive condition. However, short-term memory items did not generate a high percentage of memory labels in Study 2. Perhaps laypersons can better assess the prototypicality of items when the super-ordinate category (i.e., memory) is supplied than when they are required to generate it themselves. Finally, the distinctive features of the memory concept address individual differences in memory perceptions. Intense memory experiences for one individual may not be rated as such by another and it is believed that the distinctive features are lower-levels in the memory hierarchy.

Finally, the first three studies indicated that the memory representation may be composed of task and non-task variables. An

examination of the freely-listed exemplars revealed that the majority of the frequently listed items are task relevant (e.g., study, memory of past). However, the lowest rated items in Study 3 involve non-task items (e.g., locus of control, anxiety about memory). Beliefs such as "I have a good memory because I can perform short-term memory tasks" may reflect people's perceptions of ability, which has implications for a theory about the self (Sehulster, 1981). Because self-evaluation is important, examination of performance on memory tasks enables construction of theories about abilities. Memory items that do not have a performance component cannot provide information about ability, and therefore, items without a performance component are more weakly associated with the memory concept.

The present research indicates that laypersons' memory concept may have prototypic structures. Due to differences in memory experiences, individuals may have a shared central structure (e.g., memory processing dimensions) with more discrepant less central structures (e.g., memory content dimensions). When comparisons are made between the structures of laypersons and experts, there also are commonalities and discrepancies. The interpretation that is offered includes a language, a memory affect and a memory process/content dimension. If the affect domain is interpreted as a non-memory factor (Hultsch, Dixon, & Hertzog, 1985), then the dimensions of memory are identified as composed of a language factor and a memory process/content factor. But, inasmuch as relevant memory dimensions are important, non-memory dimensions also are considered in the concept of

memory. Therefore, the concept of memory is composed of both associated and non-associated domains.

The dimensions identified in the present studies are similar to those found by Sehulster (1981). In his research, Sehulster interpreted three memory dimensions: verbal, memory of the past, and memory for agreeing to do something in the future. The language dimension interpreted in the present study corresponds with Sehulster's verbal dimension. A verbal or communication dimension may be the foundation of the memory concept because the ability to communicate effectively is vital for everyday functioning. As a result, communication skills may form the basis for people's evaluations of adequate memory processing.

The memory process/content dimension identified in the present research is similar to the memory of past dimension in Sehulster's research. Although he based the dimension on remembering historical information (e.g., childhood events) which relied on content, the present results indicate that the processing of information is also of importance to people's memory concept. To the extent that the language dimension may be the underlying basis for all memory activities, this second dimension emphasized the memory tasks. For example, remembering childhood events and remembering names require people to retrieve memory content whereas attention and capacity emphasize memory processing. This segregation between process and content corresponds with the findings from the first three studies where processing appears to be a central structure in the memory concept and content serves as the more weakly associated structures.

Finally, memory affect or concerns about memory is identified as a distinct dimension in the present research whereas Sehulster (1981) incorporated memory affect into a memory of the past dimension. However, the two studies differ in that Sehulster defined memory concerns as an encoding of personal experiences with autonomic tendencies (e.g., remembering the pain of past experiences). In contrast, the present research examines concerns about memory as a weakly associated memory dimension. That is, people have differentiated memory affect items (e.g., anxiety about memory) into a separate dimension. There is some support for Sehulster's formulation of memory affect in that laypersons and practitioners tend to consider the memory concern component into their judgments of memory tasks, for example, people may be anxious about their ability to remember names. Overall, the memory affect items are seen as a separate dimension.

Comparison between the memory structures of laypersons, practitioners, and experts shows that the structures are similar although the experts' memory structure is more organized than that of the other two groups. The comparable dimensions identified among the three groups may point to the fact that the items used in the present study are ecologically valid and do not reflect methodologies used in experimental cognitive research. As a result, the items asking about everyday memory activities may elicit similar ratings from the experts. The domains that were identified also suggest that memory is not uni-dimensional and that all three groups consider language and task variables to be important. Certain items not considered as memory related encompass an affective component to memory. Although

the experts may have intentionally segregated concerns about memory from their assessment, the laypersons and practitioners regard concern as an element in every memory task.

To the extent that task relevance has implications for people's memory concept, success or failure outcomes for tasks also may be an important component. The tendency for people to accept responsibility for success and deny responsibility for failure (Miller & Ross, 1975) indicates an internal versus an external attribution, respectively. Therefore, success outcomes imply an internal component to the memory task and these will be better represented in people's memory concept. Conversely, failure on tasks imply poor ability and people may want to dissociate themselves from such an outcome. The result is to attenuate the relationship between failures on tasks from the memory concept. The findings from Study 3 support such a contention where items in the failure condition are rated as more weakly associated to memory. These results suggest that memory is an internal concept with implications for a self-theory and perceptions of memory may be affected by external contextual variables.

The fifth study of the series examined the memory concept based on contextual variables. Past studies have focused on task variables, for example, remembering people's names or phone numbers. However, little is known about the effects of external factors on the memory concept. There is some indication from Studies 2 and 3 that external context has an influence on people's memory concept. Presenting items in a success versus a failure manner is one type of external influence. It was found in Study 5 that success

or failure performance differentially affected people's ratings because performance has implications for the evaluation of competence. Individuals may only identify successful activities as memory related and deny unsuccessful activities as associated with memory abilities. This finding is consistent with the ratings of success condition items in Study 3. In addition, situational influences may affect evaluations of memory performance. For example, the contextual information that all other individuals behaved similarly (e.g., HHH condition) resulted in situational attributions of memory ability. However, when situational factors were absent, individuals attributed memory behaviors dispositionally. Finally, the results in Study 5 also indicated that when personal responsibility for a task is expected (e.g., LLH information pattern), the task is rated as more memory related than when personal responsibility is not expected.

In future assessments of people's memory concepts, researchers should take into account the external contextual effects in addition to task variables in the evaluation of memory. The results have implications for counselling those with memory problems. If perceptions of how other people would perform can be altered, for example, to convince individuals that others also have difficulty, then individuals with memory problems may form situational attributions. In effect, they would not blame themselves for lack of memory ability and consequently, be willing to work harder on achieving memory success.

The present series of studies indicated that there may be a prototypic structure to the memory concept. These results aid in the identification of

which phenomena are, and which are not, important to the laypersons' memory concept. In future memory research an attempt could be made to accommodate those memory dimensions important to laypersons. It may be interesting and important for researchers to examine what lay people consider as significant to evaluations of memory. In past and present practice, scientists have attempted to define memory in a precise and researchable manner. Memory may be operationalized in a variety of ways (e.g., study of the encoding, storage, and retrieval of word lists). But, the present research indicates that researchers need to be aware of the domains of memory to laypersons. Laypersons may not be identifying with the domains commonly used in scientific research, for example, they have a greater interest in the memory of past events (i.e., remote memory). This difficulty in the accommodation of researchable concepts and lay concepts also exists in other psychological domains like emotion (Fehr & Russell, 1984) and needs to be resolved.

It is unquestioned that basic memory research will lead to a greater understanding of memory processes and the workings of memory systems. However, the present studies suggest that the examination of lay concepts also is important. One of the goals of basic research is enable applications of findings to individuals, for example, to maintain or improve someone's memory through the development of memory aid techniques. Therefore, there is a need to thoroughly understand what lay individuals consider as critical memory dimensions to maintain throughout life. The present studies indicate that the research of lay people's ideas and concept about memory is

lacking and should be the focus of some future research.

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Appendix A.1

Stimulus items used in Experiments 2 and 3
Instances of Memory Successes

ATTENTION:
No difficulty paying attention.
Concentration is not easily broken when doing something.
Able to keep at a task even when there are other distractions.

COMPREHENSION:
When reading a newspaper, magazine or watching a television show, being able to follow the thread of a story, never losing track of what it is about.
Have no difficulty following conversations.
Able to easily follow verbal or written instructions given by someone or provided in a manual.

DIRECTION FOLLOWING:
Have no difficulty remembering the directions long enough to get to a new place.
Never getting lost or turning the wrong direction on a journey, on a walk or in a building where one has OFTEN been before.
Never getting lost or turning the wrong direction on a journey, on a walk or in a building where one has ONLY BEEN ONCE OR TWICE before.

SHORT-TERM MEMORY:
It is easy to read when others are talking.
Have no difficulty remembering a phone number even if interrupted before dialing.
Have no difficulty doing mental arithmetic.

WORD FINDING:
Always able to find the proper word to use in a conversation or when writing.
Always able to find the right word without having to actively seek it.
Never described something with the wrong word.

NAMES:
Able to remember the names of people a few days after first introduction.
Able to remember the name of a book after it has been read or a song title or the names of characters in shows or in books.
Have no difficulty remembering the names of places visited on vacations or trips.

EXPRESSIVE:
Able to describe something while it is happening.
Able to give directions that are clear and easy to follow.
Able to make up and tell a story to others.

VISUO-SPATIAL:
Able to recognize places told to have visited before.
Able to find the door used to enter a shopping mall.
Able to find one's way somewhere with just physical landmarks as a guide and without knowing actual street numbers or street names.

UPDATING INFORMATION:
Never do some routine thing twice by mistake (e.g., putting two lots of tea in the teapot, or going to brush/comb one's hair after just doing so).
Able to remember changes in schedules or times (e.g., bus, television programs, etc.).
Able to provide the new phone number (or new bank account number) after it has been changed.

REMOTE:
Able to remember events from childhood.
Able to recognize photographs of family or friends from childhood.
Able to remember the teachers from grade school.

RETROSPECTIVE:
Always remembered to take things along, or never leaving things behind and having to go back and fetch them.
Remember where things are normally kept or looking for them in the right place.
Remembering phone numbers used frequently.
Remember the details of things done regularly, whether at home or at work (e.g., locking the door, turning the stove off).
Never repeating to someone what one has just told them or asking them the same question twice.
When something is borrowed, able to remember whether it has been returned.
Able to remember details of what happened a day or two ago.

PROSPECTIVE:
Able to remember regular appointments (e.g., weekly club meetings, regular golf or tennis games, etc.).
Able to remember irregular appointments (e.g., visit optometrist once a year, yearly medical checkup).
Able to remember to take medications on time.
Able to remember to send cards for birthdays or anniversaries on time.

PROSPECTIVE CONTENT:
Remember to tell somebody something important. Perhaps remember to pass on a message or remind someone of something.
Able to remember what to get in another room once in the room.
Able to remember what to buy at the store when one gets there.

SOURCE:
Able to remember WHERE one had read or heard something.
Able to remember WHO mentioned or described something.
Able to recognize a person and the place or situation where one has met him/her.

STRESS:
No difficulty remembering when ill than when healthy.
No difficulty remembering when under pressure.
No difficulty remembering when unhappy or depressed.

TIME:
Able to remember when it was that something happened (e.g., whether it was yesterday or last week).
Remembering being told something yesterday or a few days ago.
Able to accurately estimate time.

TASK:
Interesting facts are easier to remember than facts that are not.
Easier to remember information for a short time than for a long time.
Able to remember words one wants to use than words never used.

CAPACITY:
Think one is good at remembering places visited.
Think one is good at remembering names.
Think one is good at remembering past conversations.

CHANGE:
Able to remember a change in daily routine, such as a change in the place where something is kept, or a change in the time something happens (e.g., not following the old routine by mistake).
Able to remember things better now than 10 years ago.
Able to remember things now as well as before.

ACTIVITY:
Spends alot of time reading books.
Spends alot of time reading newspapers.
Spends alot of time watching TV.

ANXIETY:
Easily upset if can't remember something of relevance.
Anxious when asked to remember something.
Anxious when one feels his/her memory is not as good as other people's.

ACHIEVEMENT:
It is important to have a good memory.
A good memory is something to be proud of.
It is worthwhile to work towards having a good memory.

LOCUS OF CONTROL:
One has control over their own memory abilities.
There is high motivation to remember new things learned.
Working at one's memory abilities will ensure that it will not decline.

ONGOING ACTIVITIES:
Able to remember what one is presently doing.
Remember what one is going to say in mid-sentence.
Able to stop from rambling on to speak about unimportant or irrelevant things.

FACES:
Finding that the faces of famous people seen on television or in photographs, look familiar.
Able to recognize, by sight, close relatives or friends that one meets frequently.
Able to imagine someone's face even if one has not seen the person in a long time.

INTENT:
Know whether one has done something that was meant to do.
Remember to do things one has said he/she would do and things one has planned to do.
Able to better remember facts that are of importance than facts that are not.

Instances of Memory Failures

ATTENTION:
Always have difficulty paying attention.
Concentration is easily broken when doing something.
Unable to keep at a task even when there are other distractions.

COMPREHENSION:
When reading a newspaper, magazine or watching a television show, unable to follow the thread of a story, losing track of what it is about.
Have difficulty following conversations.
Unable to easily follow verbal or written instructions given by someone or provided in a manual.

DIRECTION FOLLOWING:
Have difficulty remembering the directions long enough to get to a new place.
Getting lost or turning the wrong direction on a journey, on a walk or in a building where one has OFTEN been before.
Getting lost or turning the wrong direction on a journey, on a walk or in a building where one has ONLY BEEN ONCE OR TWICE before.

SHORT-TERM MEMORY:
It is difficult to read when others are talking.
There is difficulty remembering a phone number if interrupted before dialing.
Have difficulty doing mental arithmetic.

WORD FINDING:
Unable to find the proper word to use in a conversation or when writing.
Unable to find the right word without having to actively seek it.
Find that something was described with the wrong word.

NAMES:
Unable to remember the names of people a few days after first introduction.
Unable to remember the name of a book after it has been read or a song title or the names of characters in shows or in books.
Have difficulty remembering the names of places visited on vacations or trips.

EXPRESSIVE:
Unable to describe something while it is happening.
Unable to give directions that are clear and easy to follow.
Unable to make up and tell a story to others.

VISUO-SPATIAL:
Unable to recognize places told to have visited before.
Unable to find the door used to enter a shopping mall.
Unable to find one's way somewhere with just physical landmarks as a guide and without knowing actual street numbers or street names.

UPDATING INFORMATION:
Do some routine thing twice by mistake (e.g., putting two lots of tea in the teapot, or going to brush/comb one's hair after just doing so).
Unable to remember changes in schedules or times (e.g., bus, television programs, etc.).
Unable to provide the new phone number (or new bank account number) after it has been changed.

REMOTE:
Unable to remember events from childhood.
Unable to recognize photographs of family or friends from childhood.
Unable to remember the teachers from grade school.

RETROSPECTIVE:
Never remember to take things along, or leaving things behind and having to go back and fetch them.
Not remember where things are normally kept or looking for them in the wrong place.
Not remembering phone numbers used frequently.
Not remember the details of things done regularly, whether at home or at work (e.g., locking the door, turning the stove off).
Repeating to someone what one has just told them or asking them the same question twice.
When something is borrowed, unable to remember whether it has been returned.
Unable to remember details of what happened a day or two ago.

PROSPECTIVE:
Unable to remember regular appointments (e.g., weekly club meetings, regular golf or tennis games, etc.).
Unable to remember irregular appointments (e.g., visit optometrist once a year, yearly medical checkup).
Unable to remember to take medications on time.
Unable to remember to send cards for birthdays or anniversaries on time.

PROSPECTIVE CONTENT:
Not remember to tell somebody something important. Not remember to pass on a message or remind someone of something.
Unable to remember what to get in another room once in the room.
Unable to remember what to buy at the store when one gets there.

SOURCE:
Unable to remember WHERE one had read or heard something.
Unable to remember WHO mentioned or described something.
Unable to recognize a person and the place or situation where one has met him/her.

STRESS:
Difficulty remembering when ill than when healthy.
Difficulty remembering when under pressure.
Difficulty remembering when unhappy or depressed.

TIME:
Unable to remember when it was that something happened (e.g., whether it was yesterday or last week).
Not remember being told something yesterday or a few days ago.
Unable to accurately estimate time.

TASK:
Interesting facts are more difficult to remember than uninteresting facts.
Difficult to remember information for a short time than for a long time.
Unable to remember words one wants to use than words never used.

CAPACITY:
Think one is poor at remembering places visited.
Think one is poor at remembering names.
Think one is poor at remembering past conversations.

CHANGE:
Unable to remember a change in daily routine, such as a change in the place where something is kept, or a change in the time something happens (e.g., following your old routine by mistake).
Remember things more poorly now than compared to 10 years ago.
Unable to remember things now as well as before.

ACTIVITY:
Spends little time reading books.
Spends little time reading newspapers.
Spends little time watching TV.

ANXIETY:
Never upset if can't remember something of relevance.
Never anxious when asked to remember something.
Never anxious even when one feels his/her memory is not as good as other people's.

ACHIEVEMENT:
It is unimportant to have a good memory.
A good memory is NOT something to be proud of.
It is NOT worthwhile to work towards having a good memory.

LOCUS OF CONTROL:
There's little control over one's memory abilities.
There is low motivation to remember new things learned.
Working at one's memory abilities will not ensure that it will be maintained.

ONGOING ACTIVITIES:
Unable to remember what one is presently doing.
Not remember what one is going to say in mid-sentence.
Unable to stop from rambling on to speak about unimportant or irrelevant things.

FACES:
Finding that the faces of famous people seen on television or in photographs, look unfamiliar.
Unable to recognize, by sight, close relatives or friends that one meets frequently.
Unable to imagine someone's face even if one has not seen the person in a long time.

INTENT:
Don't know whether one have done something that was meant to do.
Not remember to do things one has said he/she would do and things one planned to do.
Unable to better remember facts that are of importance than facts that are not.

Appendix A.2

Samples of the range of labels provided for each of the 26 subcategories in Study 2 (Positive versus Negative conditions)

Names:
Positive: recall, names, long-term memory (LTM)
Negative: forget, associate, short-term memory (STM)

Source:
Positive: recognition, photographic memory, associate
Negative: forget, recall, associate

Remote remembering:
Positive: childhood, experience, LTM
Negative: forget, familiarity, recall

Updating information:
Positive: attentive, recall, learning
Negative: forget, concentration, attention

Prospective remembering:
Positive: dates, calender memory, schema
Negative: forget, concern, concentration

Change:
Positive: STM, development, LTM
Negative: aging, habit, LTM

Facial:
Positive: photographic memory, faces, recall
Negative: recall, recognition, STM

Prospective content:
Positive: reminders, remember, STM
Negative: forget, attention, STM

Direction following:
Positive: sense of direction, familiarity, STM, LTM
Negative: orientation, sense of direction, STM

Retrospective remembering:
Positive: STM, remember, organization
Negative: STM, forget, remember

Task:
Positive: subjective recall, interest, STM
Negative: selective, STM, attention

Time:
Positive: LTM, STM, time
Negative: time, STM, recall

Visuo-spatial:
Positive: recall, navigation, sense of direction
Negative: recall, sense of direction, identification

Capacity:
Positive: recall, opinion, LTM
Negative: remember, observation, emotion

Intent:
Positive: insight, plan, recall
Negative: confused, concentration, forget

Ongoing activities:
Positive: self-control, STM, concentration
Negative: control, confused, concentration

Stress:
Positive: mentally healthy, LTM, concentration
Negative: concentration, pressure, anxiety

Short-term remembering:
Positive: concentration, study, intelligence
Negative: concentration, distraction, cognitive skills

Word finding:
Positive: vocabulary, intelligent, diction
Negative: vocabulary, language, recall

Achievement:
Positive: opinion, value, emotion
Negative: emotion, confidence, importance

Locus of control:
Positive: control, recall, opinion
Negative: opinion, importance, value

Comprehension:
Positive: concentration, attentive, intelligence
Negative: concentration, attention, understanding

Anxiety:
Positive: anxiety, emotion, frustration
Negative: emotion, confidence, opinion

Expressive language:
Positive: creative, intelligent, verbal skills
Negative: imagination, skills, language

Attention:
Positive: concentration, attention, control
Negative: concentration, attention, distraction

Activities:
Positive: intellect, interest, current events
Negative: active, interest, intelligent

Note: The above provided a sampling of the labels given by participants under each subcategory. The above listed did not take into account the "Memory" label provided by the participants.

Appendix B

The two sets of stimulus items used for the MDS studies in Experiment 4

Set A:

Attention: (Att)
Concentration is not disrupted when doing something.

Comprehension: (Comp)
When reading a newspaper, magazine or watching a television show, being able to follow the thread of a story, never losing track of what it is about.

Direction Following: (Df)
Remembering the directions long enough to get to a new place.

Short-term memory: (Stm)
Remembering a phone number even if interrupted before dialing.

Word finding: (Wf)
Finding the right words to use in conversations.

Names: (Name)
Remembering the title of a book after it has been read.

Expressive: (Exp)
Giving the outline of something while it is happening.

Visuo-Spatial: (Spat)
When leaving, able to find the door used to enter a shopping mall.

Updating: (UpD)
Providing a new phone number (or new bank account number) after it has been changed.

Remote: (Rem)
Remembering events from childhood.

Retrospective: (Ret)
Remembering the details of what happened a day or two ago.

Prospective: (Pro)
Remembering irregular appointments (e.g., visit the optometrist once a year, go for a yearly medical checkup).

Prospective content: (PC)
Remember to tell somebody the content of a message or a reminder of what they should do.

Source: (Soc)
Remember WHERE one has read or heard something.

Stress: (Stress)
Remembering things even when unhealthy or ill.

Time: (Time)
Remembering when it was that something happened (e.g., whether it was yesterday or last week).

Task: (Task)
Easier to retain information for a short time but not for long periods.

Capacity: (Capa)
Able to carry on more than one task at a time.

Activity: (Act)
Spends a lot of time reading books.

Anxiety: (Anx)
Easily upset if cannot remember something of relevance.

Achievement: (Ach)
It is worthwhile to work towards having a good memory.

Control: (Cont)
Working at one's memory abilities will ensure that it will not decline.

Ongoing: (Ong)
Remember what one is going to say in mid-sentence.

Faces: (Faces)
Able to imagine someone's face even if one has not seen the person in a long time.

Intent: (Int)
Remembering something requires that a person tries to remember.

Set B

Attention: (Att)
Keep at a task even when there are other distractions.

Comprehension: (Comp)
Able to follow conversations.

Direction following: (Df)
Never getting lost or turning the wrong direction on a journey, on a walk or in a building where one has ONLY BEEN ONCE OR TWICE before.

Short-term memory: (Stm)
Able to do mental arithmetic for a series of operations (or numbers).

Word finding: (Wf)
Finding the proper words to use when writing.

Names: (Name)
Remember the names of people a few days after first introduction.

Expressive: (Exp)
Able to describe something while it is happening.

Visuo-Spatial: (Spat)
Finding one's way somewhere without knowing actual street numbers or street names.

Updating: (UpD)
Remembering changes in schedules or times (e.g., bus, television programs, etc.).

Remote: (Rem)
Recognize photographs of family or friends from childhood.

Retrospective: (Ret)
Remembering to take things along, or never leaving things behind and having to go back and fetch them.

Prospective: (Pro)
Remembering to send cards for birthdays or anniversaries on time.

Prospective content: (PC)
Remember what to buy at the store when one gets there.

Source: (Soc)
Remember WHO mentioned or described something.

Stress: (Stress)
Remembering things even when under pressure.

Time: (Time)
Able to estimate time accurately.

Task: (Task)
Interesting facts are easier to remember than facts that are not.

Capacity: (Capa)
Able to drive properly when someone is talking in the car.

Activity: (Act)
Spends a lot of time reading newspapers.

Anxiety: (Anx)
Anxious when one feels his/her memory is not as good as other people's.

Achievement: (Ach)
A good memory is something to be proud of.

Control: (Cont)
One has control over their own memory abilities.

Ongoing: (Ong)
Remember what one is presently doing.

Faces: (Faces)
Finding that the faces of famous people seen on television or in photographs, look familiar.

Intent: (Int)
Remembering requires some exertion of effort.

Appendix C

Scenario information presented in Experiment 5

HHH pattern: High memory related

Prospective/positive performance:

Kelly has no difficulty remembering appointments. According to a survey taken, most people also experience little difficulty remembering appointments.

In general, Kelly usually has trouble remembering other types of things, for example, sending cards for birthdays or anniversaries on time. Finally, Kelly has no difficulty remembering appointments regardless of when Kelly is asked to remember such information.

Prospective/negative performance:

Kelly has difficulty remembering appointments. According to a survey taken, most people also experience difficulty remembering appointments.

In general, Kelly usually has no trouble remembering other types of things, for example, sending cards for birthdays or anniversaries on time. Finally, Kelly has difficulty remembering appointments regardless of when Kelly is asked to remember such information.

Remote/positive performance:

Robin is able to remember friends from childhood. According to a survey taken, most people can remember friends from their childhood.

In general, Robin usually has trouble remembering other types of things, for example, remembering teachers from grade school. Finally, Robin can readily remember childhood friends regardless of when Robin is asked to recall this information.

Remote/negative performance:

Robin has difficulty remembering friends from childhood. According to a survey taken, most people have trouble remembering childhood friends.

In general, Robin usually has no trouble remembering other types of things, for example, remembering teachers from grade school. Finally, Robin has difficulty remembering childhood friends regardless of when Robin is asked to recall this information.

Name/positive performance:

Laurie is able to remember the names of people a few days after first introduction. According to a survey taken, most people can remember people's names a few days after they have been introduced.

In general, Laurie usually has trouble remembering other types of things, for example, book titles a short time after reading the books. Finally, Laurie has no difficulty recalling people's names regardless of when Laurie is asked to provide this information.

Name/negative performance:

Laurie cannot remember the names of people a few days after first introduction. According to a survey taken, most people cannot remember people's names a few days after they have been introduced.

In general, Laurie usually has no trouble remembering other types of things, for example, book titles a short time after reading the books. Finally, Laurie has difficulty recalling people's names regardless of when Laurie is asked to provide this information.

HHH pattern: Low memory related

Comprehension/positive performance:

Pat is able to follow the storyline when reading a newspaper. According to a survey taken, most people can also follow the thread of a story while reading.

In general, Pat usually cannot follow the story of other types of things, for example, television shows. Finally, Pat is able to follow the storyline when reading a newspaper regardless of when Pat is asked to do so.

Comprehension/negative performance:

Pat is not able to follow the storyline when reading a newspaper. According to a survey taken, most people also have difficulty following a story while reading.

In general, Pat usually can follow the story of other types of things, for example, television shows. Finally, Pat is unable to follow the storyline when reading a newspaper regardless of when Pat is asked to do so.

Word Finding/positive performance:

Leslie is always able to find the proper words to use when writing. According to a survey taken, most people have no difficulty finding the proper words to use.

In general, Leslie usually has trouble with finding the proper words to use, for example, when doing crossword puzzles. Finally, Leslie has no difficulty finding proper words to use regardless of when Leslie is involved in writing.

Word Finding/negative performance:

Leslie has difficulty finding the proper words to use when writing. According to a survey taken, most people have difficulty finding the proper words to use.

In general, Leslie usually has no trouble with finding the proper words to use, for example, when doing crossword puzzles. Finally, Leslie has difficulty finding proper words to use regardless of when Leslie is involved in writing.

Expressive/positive performance:

Sandy is able to describe something while it is happening (e.g., a hockey game). According to a survey taken, most people can describe ongoing events.

In general, Sandy usually has trouble describing other types of things, for example, describing the ongoing action of a cartoon. Finally, Sandy has no difficulty describing something while it is happening regardless of when Sandy is asked to provide such information.

Expressive/negative performance:

Sandy is unable to describe something while it is happening (e.g., a hockey game). According to a survey taken, most people cannot describe ongoing events.

In general, Sandy usually has no trouble describing other types of things, for example, describing the ongoing action of a cartoon. Finally, Sandy has difficulty describing something while it is happening regardless of when Sandy is asked to provide such information.

LLH Pattern: High memory related

Prospective/positive performance:

Kelly has no difficulty remembering appointments. According to a survey taken, most people experience difficulty remembering appointments.

In general, Kelly usually remembers other types of things, for example, send cards for birthdays or anniversaries on time. Finally, Kelly has no difficulty remembering appointments regardless of when Kelly is asked to remember such information.

Prospective/negative performance:

Kelly has difficulty remembering appointments. According to a survey taken, most people have no difficulty remembering appointments.

In general, Kelly usually has trouble remembering other types of things, for example, send cards for birthdays or anniversaries on time. Finally, Kelly has difficulty remembering appointments regardless of when Kelly is asked to remember such information.

Remote/positive performance:

Robin is able to remember friends from childhood. According to a survey taken, most people cannot remember friends from their childhood.

In general, Robin usually has no trouble remembering other types of things, for example, remembering teachers from grade school. Finally, Robin has no difficulty remembering childhood friends regardless of when Robin is asked to recall this information.

Remote/negative performance:

Robin has difficulty remembering friends from childhood. According to a survey taken, most people have no trouble remembering childhood friends.

In general, Robin usually has trouble remembering other types of things, for example, remembering teachers from grade school. Finally, Robin has difficulty remembering childhood friends regardless of when Robin is asked to recall this information.

Name/positive performance:

Laurie is able to remember the names of people a few days after first introduction. According to a survey taken, most people cannot remember others' names a few days after they have been introduced.

In general, Laurie has no trouble remembering other types of things, for example, book titles a short time after reading the books. Finally, Laurie has no difficulty recalling people's names regardless of when Laurie is asked to provide this information.

Name/negative performance:

Laurie cannot remember the names of people a few days after first introduction. According to a survey taken, most people can remember others' names a few days after they have been introduced.

In general, Laurie usually has trouble remembering other types of things, for example, book titles a short time after reading the books. Finally, Laurie has difficulty recalling people's names regardless of when Laurie is asked to provide this information.

LLH pattern: Low memory related

Comprehension/positive:

Pat is able to follow the storyline when reading a newspaper. According to a survey taken, most people have difficulty following a story while reading.

In general, Pat usually can follow the story of other types of things, for example, television shows. Finally, Pat is able to follow the storyline when reading a newspaper regardless of when Pat is asked to do so.

Comprehension/negative performance:

Pat is not able to follow the storyline when reading a newspaper. According to a survey taken, most people can follow a story while reading.

In general, Pat usually cannot follow the story of other types of things, for example, television shows. Finally, Pat is unable to follow the storyline when reading a newspaper regardless of when Pat is asked to do so.

Word Finding/positive performance:

Leslie is always able to find the proper words to use when writing. According to a survey taken, most people have difficulty finding the proper words to use.

In general, Leslie usually has no trouble with finding the proper words to use, for example, when doing crossword puzzles. Finally, Leslie has no difficulty finding proper words to use regardless of when Leslie is involved in writing.

Word Finding/negative performance:

Leslie has difficulty finding the proper words to use when writing. According to a survey taken, most people have no difficulty finding the proper words to use.

In general, Leslie usually has trouble with finding the proper words to use, for example, when doing crossword puzzles. Finally, Leslie has difficulty finding proper words to use regardless of when Leslie is involved in writing.

Expressive/positive performance:

Sandy is able to describe something while it is happening (e.g., a hockey game). According to a survey taken, most people cannot describe ongoing events.

In general, Sandy usually has no trouble describing other types of things, for example, describing the ongoing action of a cartoon. Finally, Sandy has no difficulty describing something while it is happening regardless of when Sandy is asked to provide such information.

Expressive/negative performance:

Sandy is unable to describe something while it is happening (e.g., a hockey game). According to a survey taken, most people can describe ongoing events.

In general, Sandy usually has trouble describing other types of things, for example, describing the ongoing action of a cartoon. Finally, Sandy has difficulty describing something while it is happening regardless of when Sandy is asked to provide such information.

Questions answered by participants in Experiment 5

1. How important were (the person's) OWN PERSONAL CHARACTERISTICS in causing the person to (act in the particular manner)? That is, to what extent do you think (the act) was caused by something unique about the person (e.g., the person's general memory abilities, personality, temperament, intelligence, etc.)?

2. How important were CHARACTERISTICS OF THE SITUATION in causing the person to (act in the particular manner)? That is, to what extent do you think the person's (act) was caused by something unique about the particular situation (e.g., it was a simple or difficult task, there were surrounding circumstances such as distractions, etc.)?

3. How much do you think (the act) is the result of the person's memory ability?

4. To what extent is (the act) regardless of how the person did, a good or poor example of memory to you?

5. To what extent is the person, compared to people in general, skilled at the (act)?

6. To what extent is the person's (act) a good or poor indicator of memory ability?

7. To what extent did other people also (acted in the particular manner)?

8. To what extent is it that the person only (do the particular act) but not other related activities?

9. To what extent does the person regularly (do the act)?

Note. The (act) phrased in the above questions corresponded to the memory related or unrelated activity in each scenario.